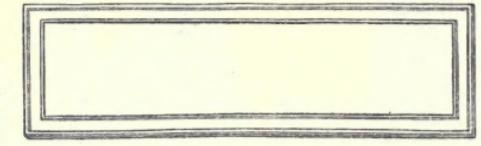
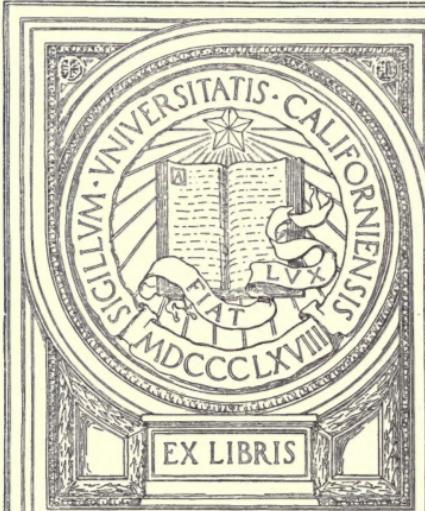




UNIVERSITY OF CALIFORNIA  
AT LOS ANGELES







Catalogue of the Wheeler Gift of  
Books, Pamphlets and Periodicals in  
the Library of the American Institute  
of Electrical Engineers







Schuyler Staats Wheeler

*Catalogue of the Wheeler Gift of  
Books, Pamphlets and Periodicals  
in the Library of the American  
Institute of Electrical Engineers*

EDITED BY

WILLIAM D. WEAVER

*Member American Institute of Electrical Engineers*

WITH INTRODUCTION, DESCRIPTIVE AND CRITICAL NOTES

BY

BROTHER POTAMIAN, Sc.D., Lond.

*Professor of Physics, Manhattan College*

*VOLUME I*



NEW YORK: AMERICAN INSTITUTE  
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DEED OF GIFT

TO THE COUNCIL AND MEMBERS OF THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS:

*It is my privilege to be able to announce the completion of negotiations by which I have become the possessor of the very remarkable collection of electrical books of the late Mr. Latimer Clark of London.*

*My object in securing the collection was to present the books to our Institute and make it the custodian of the most complete electrical Library in the world, as well as to stimulate such interest that the Institute may in time own a permanent home in New York.*

*The assurance received from those who have cooperated with me in this undertaking, that the collection is very complete and includes practically every known publication in the English language previous to 1886, on magnetism, electricity, galvanism, the lodestone, mariner's compass, etc., have been more than verified by my own examination of the books since their arrival in this country. There are among its 7,000 titles many books which are not to be found in either of the famous libraries with which it has been compared, and I find that there are even some of the very earliest examples of printing.*

*I have always been a strong believer in the principle that every professional man is under obligation to contribute in some way to the welfare of the profession in which he is engaged, and in obedience to this idea I now desire to present*

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*this Library to you complete, reserving to myself only the photographs, autographs, and such duplicate books as I may add to my own collection without detracting from the completeness of the Library.*

*As an early contributor to the Institute and one of the original members of its Building Committee, I am interested in securing for it permanent headquarters and adding to its importance, dignity and strength. It is my desire that the Institute accept the Library and through its Library Committee and a suitable Librarian administer it in such a way as to make it generally useful, and I hope that the possession of these books will add to the Institute's prestige.*

*I am inclined not to suggest rules for the management of the Library, believing that those who are in charge from time to time are in the best position to know what is desirable, but in order to fix its general character, and secure its permanence, I condition the gift upon the acceptance by the Institute of the following provisions:*

*First.—The Library to be kept insured against loss by fire as fully as it may be practicable to determine its value, and an annual appropriation of \$1,500 to be provided for its maintenance.*

*Second.—A complete catalogue raisonné to be published in the name of the Institute, reciting the conditions of gift and explaining the features of interest of each book for the convenience and information of members. This catalogue to be prepared at once and a bound copy of it to be placed in the hands of each member of the Institute.*

*Third.—The Library to be in charge and control of a Library Board or Committee made up of members of the*

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*Institute and not more than a quarter of the whole number of members of this Committee to be allied with any one commercial or other interest.*

*Fourth.—The Library to remain in New York City and to be a reference library, free to all, including non-members and available for consultation at least three days in the week and some evenings and some Sundays, as soon as the Institute is in permanent quarters.*

*Fifth.—Rare books, that is, books which it is practically impossible to replace, to be exhibited under glass with suitable explanatory cards and to be subject to closer examination only at the Library and upon suitable introduction of the visitor to the Library Committee or their representative, the Librarian, and under such other precautions as will positively assure the preservation and safety of the books.*

*And further, it is my earnest desire that the Institute shall within five years raise a sufficient fund by subscription, and provide itself with a permanent home for its meetings and Library, and that this home shall be centrally located, reasonably safe from fire and not heavily mortgaged.*

*In case of the failure of the Institute to comply with the substance or spirit of these conditions, or with the desire expressed above for a permanent home, the Library shall revert to me or my heirs or assigns.*

*Having in view the sole purpose of encouraging the Institute to attain the position which I feel sure all of its members desire, I have sought to name conditions easily within its reach.*

SCHUYLER SKAATS WHEELER.

*Ampere, New Jersey,*

*May 17th, 1901.*



## P R E F A C E

THIS work is due to the generosity of Mr. Andrew Carnegie, who donated a fund to house, catalogue and complete the celebrated Latimer Clark collection of books, pamphlets and periodicals, presented to the Library of the American Institute of Electrical Engineers by Dr. Schuyler Skaats Wheeler. A history in detail of the acquisition of the collection and of Mr. Carnegie's gift is given in the Report of the Library Committee for 1903.<sup>1</sup> It is not inappropriate to recall here that it was on the day following a "Library Dinner," given February 9, 1903, by the American Institute of Electrical Engineers, at which Dr. Wheeler and Mr. Carnegie were the guests of honor, that Mr. Carnegie announced his desire to provide in New York City the building now known as the Engineering Societies' Building. In this palatial structure, of which the two upper floors are devoted to library purposes, the collection has found an ideal home.

In planning the work, and particularly in view of the requirement of the Wheeler Deed of Gift that a copy should be placed in the hands of each member of the American Institute of Electrical Engineers, of whom but a small proportion can make use of the collection at its home in New York City, it was felt that the contents should be given as much general interest as the titular scope of the book would

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<sup>1</sup> As this Report was not published in the *Transactions* of the Institute, and also contains a history in detail of the founding of the Library, it is printed at the end of Vol. II. with the omission of the sections dealing with financial matters.

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admit. In other words, it was thought desirable to impart to the work so far as seemed feasible a direct educational value, to the end that the reader might through its pages easily trace the evolution of the electrical science and arts and form at least a passing acquaintance with the monuments of electrical literature. The character of the notes was fixed by this consideration, and in accordance with it a large number of engravings have been introduced, consisting of reproductions of significant pages of text, title pages of rare books, portraits of authors, plates illustrating epochal discoveries, etc. The admirable Introduction by Brother Potamian (Dr. M. F. O'Reilly of Manhattan College, New York City) adds in a high degree to this feature of the work, which is also furthered by an Appendix on that curious fiction of the sixteenth century, the sympathetic telegraph.

The chronological order of entries and the division into sections adopted were naturally suggested by the historical character of the collection and the special nature of some of its parts. A systematic subject classification was not found practicable for the reason that most of the books antedate any specialization in the electrical science or art. Moreover, for historical research, and especially in the early periods, a chronological arrangement has a distinct advantage where the nature of the subject matter is indicated, as in the present case, by notes accompanying the title entries. Any advantage incident to an alphabetical arrangement according to authors finds compensation in an author index, which also includes all names occurring in the titles as editor, party to a controversy or otherwise, together with all names mentioned in the annotations. Owing to the great richness of the collection in books and pamphlets relating to the telegraph, and especially to the early period of the ocean telegraph, a subject index has been provided for entries of this class.

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In making additions to his library, Mr. Latimer Clark evidently considered nothing obtainable in print should be excluded that has any relation, however slight, to the historical or technical side of electrical science or the electrical arts. This inclusiveness, which greatly enhances the value of the collection, rendered desirable some system of classification that would insure due prominence to its extensive miscellaneous portions, and also avoid what, under a strict chronological arrangement, might be the entry of an important historical work sandwiched between entries of, say, a trade catalogue and a parliamentary report. It was therefore decided to distribute the entries into sections according to certain criteria which, though far from satisfactory from a bibliographical standpoint, nevertheless appeared defensible if judged with reference to the needs of those who will make practical use of the Catalogue. Since circumstances rendered it necessary to carry out the work of classification with reference to a card transcript of titles and annotations and not from examination of the contents of each book, close scrutiny will doubtless show that some items have been misplaced. In particular, the latter method of selection might have placed in Section I. some of the entries now in Section II.

Section I., which occupies Vol. I., comprises the more notable items of the collection. Section II. consists largely of excerpts or reprints from the Transactions of learned societies, from periodicals, etc., the total of entries for this class of items being not far from two thousand. It may be added that these items, together with the pamphlets of the collection, are to be found in the Library gathered in bound volumes numbering about 200. In this section are also included a considerable number of pamphlets and some miscellaneous items, such as engravings, collections of clippings, etc. Sections III., IV. and V. comprise miscellaneous publications relating specific-

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ally to telegraphy, principally in pamphlet or circular form, and including numerous prospectuses, reports, etc., dating in the early period of cable telegraphy. Section VI. consists of reports of early electric light, telephone and electrical manufacturing companies. Section VII. relates to patent specifications and litigation. Section VIII. contains a considerable collection of parliamentary papers having an electrical bearing, and also covers legislative and legal subjects of a like nature. Section IX. comprises pamphlets, etc., relating to expositions, electrical congresses and societies. Section X. consists of entries of early electrical trade catalogues, circulars and price lists.

Much care has been bestowed on the compilation of Section XI., which is a bibliography of the sets, or partial sets, of periodicals in the collection, in number more than one hundred. The first drafts of entries in these sections were prepared from examination of the volumes and by reference to various available bibliographical sources. The drafts relating to the journals throughout the world now in existence were then submitted for revision to the present editors of these journals. The secretaries of the English, French and German electrical societies very kindly acted upon a request to have the drafts of the entries of former electrical journals printed in their languages revised by the respective librarians of such societies. In the case of British journals no longer published, the entries for those not strictly electrical in character were revised by Mr. H. M. Mayhew of the periodical department of the British Museum.

Mr. Clark took a special interest in the subject of so-called sympathetic or telepathic telegraphy, and spared no pains to make this section of his Library inclusive of the subject. In view of the completeness of this interesting department, an historical account of the idea of the sympathetic telegraph

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is given as an appendix to the Catalogue proper, together with a list of references to the more notable writings in which the subject receives notice, including some works not in the Library.

With the exception of the periodical section, in which the arrangement is alphabetical, the entries in each of the sections are, except as below noted, in chronological order according to the dates of publication. If, however, a work is represented by more than one edition, or by a translation, the chronological order is disregarded in placing such entries, which follow that of the original publication, but with the date of printing set back from the marginal date line. In the case of Peregrinus (No. 46), and of Gilbert (No. 72), and owing to the extensive collections in the Library relating to these great pioneers of electrical literature, all entries connected directly with their names are grouped under the entry earliest in date.

A very complete system of cross-references has been supplied as follows: When an author is represented in Section I. by more than one publication, the first entry under his name is accompanied by a note referring by number to *all* other entries of his work in the Catalogue. The later entries, however, are accompanied by only a single reference, this being to the earliest entry which, as noted above, is inclusive in its reference indications. Sections II.-X. have cross-references in common according to the above system, but where an author entered in any of these sections is represented in Section I., there are added the necessary cross-references. In addition to the above class of references, cross-references are included in the body of the annotations wherever by this means further light may be afforded on a work or a particular subject of interest. In brackets following the names of authors no longer living are recorded the dates of birth and

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death, except in a few cases where this information was not obtainable.

After the purchase of the Latimer Clark collection, Dr. Wheeler made a number of additions to his Gift, which are entered in the Catalogue and distinguished by an asterisk (\*) following the entry number. As the Library possessed aside from the Wheeler Gift a small number of books of an historical character, these were also entered, and are distinguished by the addition of a dagger (†) to the entry number. After the text was in type some entries were added, and a few found misplaced were transferred to their proper locations, thereby necessitating the duplication of their entry numbers, as indicated by the addition of the word *bis* to such numbers. Most of the new entries are of books and pamphlets obtained—principally by gift—in order to render more complete the representation in the Catalogue of certain authors, either by their own writings or by works related thereto. To complete the record of the history of several journals, a few sets of periodicals in the Library, but not in the collection, were entered in Section XI., and are also distinguished by a dagger mark.

Owing to the duplication of entry numbers above referred to, and especially to translations and works represented in more than one edition being assigned merely the entry number of the original edition with a distinguishing affix, as well as to the exceptions noted in the cases of Peregrinus and Gilbert, the number of the final entry of the Catalogue (5966) falls short of representing the total of publications entered in the work.

It is difficult to find terms in which to express adequately the debt of gratitude that the members of the Institute owe to Brother Potamian for his devoted labor in their behalf, as represented by the descriptive and critical notes accom-

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panying the title entries of the Catalogue. The work involved in the task extended over seven years, and was performed in a spirit akin to that which animated the scholarly writers of the early periods who are so largely represented in the Library, and who had no other incentive to their sustained labors than innate love of learning and the desire to share knowledge gained with others. Works of the ages when Latin was the language of learning have become sealed books to the modern scientific man; and Brother Potamian in pointing out in detail the contributions of their writers to the body of electrical and magnetical knowledge, has not only done justice to the memory of men who were inspiring forces in their generation, but in so doing has also enabled the reader to appreciate as real personalities what otherwise might be to him mere names of the past devoid of present human interest. But delving in famous old tomes and delectable examination of the rarities of electrical literature were but incidents in the course of the work accomplished by Brother Potamian. Months and years passed in the painstaking search for hidden gems, for matter of notable interest in every book in the collection, however slight might be the promise of reward for the labor bestowed. Naturally, the result of a research of this kind, if reckoned in terms of volume, can be but slight in proportion to the time and labor spent in carrying it out. That in the present case a rich harvest of results has been garnered in will appear from the brilliant "Introduction" of Brother Potamian to the following pages, which is in itself a contribution of the highest order to electrical literature, and one also that will cause the revision of judgments on priority in various lines of electrical discovery.

Mr. Joseph Plass, of the Library of Congress, has rendered invaluable aid in preparing the matter of the Catalogue

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for the printer, in taking care of bibliographical details, in typographical and critical reading of the proof, as well as in making innumerable researches, both in the Institute Library and the Library of Congress, to clear up matters in doubt. The card copy in long-hand was, after checking with originals to insure correctness of title entries, chronologically arranged and typewritten by Mr. Plass for the printer; it was then again carefully revised by comparison in doubtful cases with the originals, references and cross-references supplied and bibliographical researches made in the case of more notable works for information of interest to add relating to editions, authors, etc. Mr. Plass also prepared the first draft of the periodical section, compiled the author and telegraphic indexes and furnished the material for the Appendix on the sympathetic telegraph. These labors were accompanied by a zeal in performance and by a devotedness to the objects of the Catalogue that should not pass unnoticed, and which add to the obligation to Mr. Plass for his extremely efficient collaboration in the work.

The task of making the selections for the classification decided upon was confided to Mr. Adolph Voge of the Concilium Bibliographicum of Zurich, Switzerland, who fortunately was on a visit to this country when the matter came up for consideration. Mr. Voge must be relieved from any criticism that may be found applicable to the system of classification adopted, or arising from errors due to the manner in which circumstances required its details to be carried out.

The proof of Vol. I. of the Catalogue was read critically by Mr. Alfred W. Pollard of the British Museum, and Mr. Joseph Plass of the Library of Congress; also, by Mr. Paul Fleury Mottelay of New York, Prof. Silvanus P. Thompson of London, and Prof. Dr. G. Hellmann of Berlin, all of whom made suggestions which have greatly increased

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the value of the work. In addition, Mr. Mottelay, Prof. Thompson and Dr. Hellmann contributed additions to the collection in order to render more complete the representation in the Catalogue of some of the authors entered. As previously stated, Mr. H. M. Mayhew of the periodical department of the British Museum revised a considerable number of the drafts of entries of the periodical section, and acknowledgment is made of the courtesy in arranging for a like service in relation to other classes of periodicals, to Mr. G. C. Lloyd, secretary of the Institution of Electrical Engineers, London; Prof. Paul Janet, Director of the École Supérieure d'Électricité of the Société Internationale des Électriciens, Paris; and Herr G. Dettmar, General Secretary of the Verband Deutscher Elektrotechniker, Berlin; also, to the secretaries of other societies and to editors of various periodicals, for revising the drafts of the entries of their respective publications.

Courtesies and aid were also received from Dr. John S. Billings, Director of the New York Public Library; Messrs. H. H. B. Meyer, Charles Martell and James D. Thompson, of the Library of Congress; Mr. E. W. Nicholson, Librarian of the Bodleian Library, Oxford University; Mr. J. H. Canfield, Librarian of Columbia University, New York; Brother Chrysostom of Manhattan College; Dr. E. W. Auzal, Mr. Edward Caldwell, Mr. Charles L. Clarke, and Mr. Arthur Haas, New York City. The gratifying interest in the Catalogue and its objects shown by the several firms concerned in its mechanical execution—The Schlueter Printing Company, Gill Engraving Company, and J. F. Tapley Co. (binders), all of New York City—calls for recognition, especially as this interest was frequently manifested by services improving the book which were not covered by charges.



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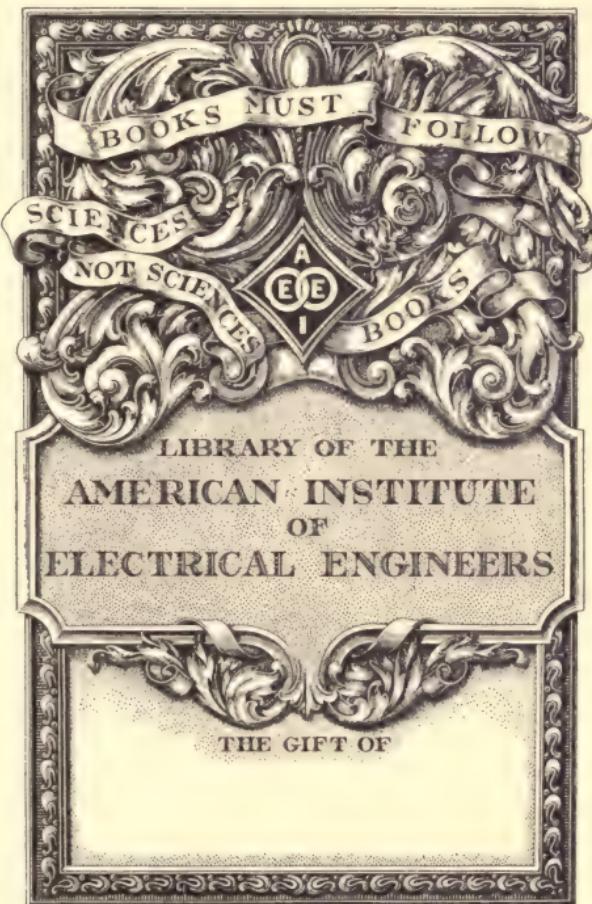
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LIBRARY BOOK PLATE  
*Gift of Mr. Edward D. Adams*



## INTRODUCTION





## INTRODUCTION

HE philosopher or the essayist, writing on hobbies of a high and inspiring nature, has two recent examples at hand to illustrate his theme, viz.: the example of Sir Francis Ronalds and that of J. Latimer Clark. These distinguished men were contemporaries and friends; both long-lived, moderately moneyed, and ardently fond of old electrical books. Ronalds died at the ripe age of eighty-five, on August 8, 1873, at which time Latimer Clark had entered on his fifty-first year, and had already been collecting material for his Library for nearly a quarter of a century. He was well aware at the outset that the Royal Society had a representative collection, and that Ronalds had even a larger number of old and rare volumes on electricity and telegraphy; yet he believed that there were still many treasures on the dust-covered shelves of private collections which awaited only an appraiser and purchaser. The Library, which for years was housed at

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*Initial, head piece and tail piece from Gilbert's De Magnete, 1600.*

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Westminster and known to the electrical world as the *Latimer Clark Library*, shows how well founded was this belief. During the last forty-eight years of his life, Mr. Clark kept a watchful eye on the lists and catalogues of famous booksellers at home and abroad, and many are the anecdotes told of the patience and shrewdness which he displayed in driving a bargain for a coveted volume.

With Mr. Clark, collecting was an occupation, serious no doubt, but one destined for spare moments and vacation months. It afforded him keen pleasure to buy, to index, and to annotate. His was a hobby fraught with pleasure for himself, and fraught for all time with interest and profit for the student of electrical history.

Josiah Latimer Clark was born at Great Marlow, on March 10, 1822. Having supplemented his elementary education by a course in his favorite subject of chemistry, he obtained employment in a technical capacity with a Dublin firm engaged in the chemical industry. In 1847, encouraged by the activity in railway construction then prevalent, he determined to exchange his chemical pursuits for an appointment as surveyor on one of the numerous lines which were projected at the time. With the knowledge and experience acquired in a twelvemonth, he joined his elder brother, Edwin, who was then resident engineer on the construction of the Britannia Tubular Bridge over the Menai Strait. It was during this period that Mr. Clark gave evidence of special aptitude for applying the energy of the electric current to the purposes of life by firing a time-gun at eight o'clock every evening. Such an achievement attracted

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the notice of Mr. J. Lewis Ricardo, who offered the Clark brothers the positions of engineer and assistant-engineer, respectively, to the newly formed Electric Telegraph Company, of which he was chairman. This was in 1850; four years later, Mr. Edwin Clark resigned and his younger brother succeeded him as engineer-in-chief, a position which he held



*J. LATIMER CLARK*

until 1861, at which time he became consulting engineer to the Company. After 1870 his services were no longer required, as the whole telegraph business of the United Kingdom was taken over by the Government and assigned to the General Post Office Department. The twenty years between 1850 and 1870, during which Mr. Clark was connected with the Electric Telegraph Company, formed for that Company a period of continuous expansion and commercial success,

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much of which must be attributed to Mr. Clark's personal influence, his inventive genius, and untiring industry.

While in the service of the Electric Telegraph Company, Mr. Clark was led to undertake a series of experiments on the flow of electricity through underground wires. As early as 1816 Ronalds, who is rightly considered the *father of the electric telegraph* in England, noticed and in 1823 clearly stated, on page 12 of his "Description of an Electric Telegraph," the *retardation* which an electric signal would undergo in passing through a long conductor; but his little pamphlet, important and suggestive as it was, attracted no attention at the time. In 1838 Faraday, commenting on Wheatstone's experiments on the "velocity of electricity," predicted that a retardation would occur on account of the electrostatic capacity of the circuit. Twelve years later, that is, in 1850, Dr. Werner Siemens, of Berlin, called attention again to this capacity-effect in a paper on testing for faults in telegraph lines, which was read before the Académie des Sciences, of Paris, on April 29 of that year. But it was not, however, until June 20, 1852, that the retardation was experimentally detected, being then observed by Mr. Clark himself on the London, Leeds, and Liverpool telegraph line. The result of the observation was withheld from the public for a time, as the Directors of the Electric Telegraph Company thought that its premature disclosure would affect their interests prejudicially. The first public demonstration was given by Mr. Clark at the Company's Gutta-Percha Works, at Lothbury, on October 4, 1853, in presence of Faraday, Airy, Edwin Clark, and other men

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eminent in the scientific world. Some time later, Mr. Clark undertook, at the request of Professors Airy and Melloni, a series of researches on the electric current which showed that, contrary to the belief of the time, the rate of flow of currents through a conductor is independent of the electric pressure used; in other words, that high potential has no advantage over low potential with regard to the velocity of transmission on land lines, or even on submarine cables. Faraday tersely expressed this in a letter which he wrote to Mr. Clark, by saying "that the force of a weak battery passes with equal rapidity along the line as that of a strong battery."<sup>1</sup>

All this seems to have been forgotten in 1858 when batteries of 380 and even 420 Daniell cells were used at Valentia to force signals through the Atlantic cable; and, on these proving unsatisfactory, recourse was had to the excessive penetrative energy of the induction coil, with the result that a cable costing millions did not long withstand the ill-advised treatment to which it was subjected.

In this connection an experimental test, made by Mr. Clark in 1866, is of special interest. Writing from Valentia, on September 12, he says: "With a single galvanic cell composed of a few drops of acid in a *silver thimble*<sup>2</sup> and a fragment of zinc weighing a grain or two, conversation may easily, though slowly, be carried on through one of the cables (1865, 1866), or through the two joined together at Newfoundland to form a loop; and, although in the latter case the spark, twice traversing the breadth of the Atlantic, has to pass through 3700 miles of cable, its effects at the receiving end

<sup>1</sup> Faraday's MS. letter, *Latimer Clark Pamphlets*, Vol. ii., p. 3.

<sup>2</sup> Signals were sent in 1866 from Newfoundland to Valentia by means of a cell consisting of a copper gun-cap with a strip of zinc excited by a drop of water.

are visible in the galvanometer in a little more than a second after contact is made with the battery. The deflections are not of a dubious character, but full and long, the spot of light traversing freely a space of 12 to 18 inches on the scale; and it is manifest that a battery many times smaller would suffice to produce similar effects."<sup>3</sup>

As might be expected, Faraday was greatly interested in the experiments on retardation which he witnessed and which he said "offered a remarkable illustration of the mutually dependent nature of induction, conduction and insulation." Accordingly, after further communication with Mr. Clark, he prepared a Friday-evening discourse on "Associated Cases of Current and Electrical Effects," which he delivered at the Royal Institution on January 20, 1854.<sup>4</sup> This circumstance gave rise to the impression that the experiments referred to in the lecture had actually been made by Faraday himself on subterranean lines. An equivalent and equally erroneous statement is sometimes found in text-books, and also in scientific periodicals and technical papers.

In July, 1857, Mr. Clark invited Faraday to attend a *séance* of a spiritualistic character, which elicited from the Professor such condemnatory remarks as the following: "But how is it that the believers in these things make such a shouting-out for scientific men? Why not become scientific themselves and prove their own so-called facts as scientific men prove theirs?"<sup>5</sup>

To Sir George Airy, the Astronomer Royal of the time,

<sup>3</sup> Printed letter, *Latimer Clark Pamphlets*, Vol. ii., p. 10.

<sup>4</sup> *Experimental Researches*, pp. 508-517.

<sup>5</sup> MS. letter, *Latimer Clark Pamphlets*, Vol. ii., p. 4.

Mr. Clark also rendered material assistance in 1857, by helping to make the necessary arrangements for the simultaneous transmission of mean solar time throughout the country from the Observatory at Greenwich. He also concurred with Prof. Airy in determining differences of longitude by means of the electric telegraph.

In the same year, 1857, Mr. Clark, having noticed a violent disturbance of magnetic needles during an auroral display, suggested to the Astronomer Royal the utility of attaching wires to magnetic observatories in the four cardinal directions, expecting them to act as antennæ or feelers of approaching magnetic storms.<sup>6</sup>

The insulation of air-lines attracted Mr. Clark's attention at an early period in his professional career, and led in 1856 to the invention by him of the earthenware insulator known as the "double cup invert." Two years later, in 1858, he took up the much-debated subject of the preservation of submerged cables with the result that he gave manufacturers a material, *Clark's Compound*, which was found very serviceable as a covering in extending the life of a cable. Some years later, Mr. Clark suggested the use of stamps for telegrams as practised in England; also an abbreviated code for cable messages as used throughout the world to-day.

We henceforth find Mr. Clark taking a prominent part in most electrical enterprises of magnitude. In 1859, at a period of great telegraphic depression caused by the failure of the first Atlantic cable, he was appointed engineer to the Atlantic Telegraph Company. In 1860 his name appears on

<sup>6</sup> See Airy's letter, *Latimer Clark Pamphlets*, Vol. ii. p. 36.

a joint committee of the Board of Trade and the Atlantic Telegraph Company, appointed to inquire into the perplexing question of the day, the failure of submarine cables. Mr. Clark took an active part as an expert in the prolonged investigations of the committee and also in the preparation of the report itself, which document contains a great body of information on the whole subject of submarine telegraphy. The supplementary report was written by Mr. Clark himself; and in it he treats very fully of the laws which govern the propagation of electrical currents in long submarine cables.

His next communication, in the preparation of which he was assisted by his distinguished partner, Sir Charles Bright, was on "The Formation of Standards of Electrical Quantity and Resistance," and was read at the Manchester meeting of the British Association in 1861. It was a memorable and fruitful paper, inasmuch as it brought about, at the instance of Sir William Thomson (Lord Kelvin), the appointment of a committee, of which Sir Charles Bright and Mr. Latimer Clark subsequently became members,<sup>7</sup> to report on the general and vitally important question of the fundamental electrical units. This was the first meeting of a committee that was destined to accomplish much in the electric and electromagnetic field; it was the initial impulse of a long-continued movement that brought renown to the whole body of English electricians. The members of the committee appointed in 1861 were Professors Williamson, Wheatstone, Thomson, and Miller, together with Dr. Matthiessen and Mr. Fleeming Jenkin. The first report was presented in the

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<sup>7</sup> Sir Charles Bright in 1863 and Latimer Clark in 1867.

following year, 1862; and, though dealing mainly with the unit of resistance, it virtually laid the foundation of the C. G. S. system of electric, magnetic and electromagnetic units from which followed immediately the practical units of current, resistance and capacity. It is worthy of note that not only the system of units itself, but also the very nomenclature proposed by the authors of the paper and recommended by the committee, viz.: the ohm, the volt, and the farad, met with universal acceptance, such necessary additions as the ampere, the coulomb, the watt, and the joule being made in course of time.

Among later members of the committee were Professors Clerk Maxwell, Balfour Stewart, Carey Foster; Dr. Joule, Dr. Hopkinson; Sir William Siemens, Lord Rayleigh, Sir William Preece, Sir Oliver Lodge; and Professors Adams, Johnstone Stoney, Everett, Aryton and Perry.

Mr. Clark will, however, be best remembered by the zinc-mercury standard of electromotive force which he described at length in a paper that was communicated to the Royal Society through Sir William Thomson in 1873. It cost him many months of close work involving delicate chemical manipulation and precise, physical measurements; but he was well repaid for the anxiety and labor incurred in his investigations by the high degree of constancy attained in the standard cell, which became at once an indispensable unit in every laboratory and testing-room in the world. The Clark cell was the prototype of the Weston cadmium cell which is so extensively used in national standardization institutions to-day.

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It was at this time that Mr. Clark called attention to the care with which shunts must be used in comparative measurements of condenser-discharges, on account of the momentary currents set up in the galvanometer-coils by the swing of the needle itself. The whole matter was closely studied by Mr. Clark and discussed in a paper which was read before the Society of Telegraph Engineers in 1873.

During the two years, 1867-1869, and again in 1879, Mr. Clark took a leading part in showing at the meetings of the British Association the unsatisfactory character of the Birmingham Wire Gauge, and it was mainly due to his efforts and perseverance that the present imperial standard was introduced and finally adopted.

In 1868 Mr. Clark published his *Principles of Electrical Measurement*, a short treatise which was well calculated to give the practical electrician clear views of the principles underlying his every-day work. Its merits were promptly and widely recognized, for in a very short time it was translated into French, Spanish, and Italian. Considerable use is made in this early work on electrical measurement of a potentiometer designed by Mr. Clark, which supplied a long-felt want for an easy and accurate method of comparing electro-motive forces.

The scientific work and professional eminence of Mr. Clark were recognized at various periods of his life by his election as member of the Institution of Civil Engineers in 1861, Fellow of the Royal Astronomical Society in 1874, Chevalier de la Légion d'Honneur in 1881, and Fellow of the Royal Society in 1889.

Though essentially a civil engineer and a practical electrician, Mr. Clark indulged in certain non-professional pursuits which afforded him congenial distraction during his leisure hours. He was a lover of flowers and a devotee of astronomy. "Hitherwood," his beautiful and spacious home at Upper Norwood, was decorated in all seasons with plants and flowers cultivated with his own hands; and, wherever he happened to be at night, the starry dome afforded him occupation as it always filled him with delight. He introduced, in 1882, a simple form of transit instrument which was mainly intended for the determination of local time, but which has also done much to facilitate and popularize this fascinating branch of knowledge, the study of the heavens.

In the practice of his profession, Mr. Clark superintended the laying of cables to Holland and Belgium, accompanied telegraph expeditions to India, and acted with Sir Charles Bright as engineer to the Anglo-American Telegraph Company when laying the cables of 1865 and 1866. It was on this occasion that Mr. Clark made the interesting test of sending signals through the united length of the two Atlantic cables, to which reference was made on page 21.

Mr. Clark left casual notes of occurrences and personal experiences in the North Sea, the Red Sea, and the Atlantic Ocean, which show some of the amenities, not to say tribulations, which an electrical engineer is liable to encounter in the discharge of his duty.

In other departments of engineering, Mr. Clark was engaged in important operations in which, together with Mr. John Standfield, he devised mammoth hydraulic hoists for use

on canals, a floating dock, and a mode of raising sunken ships. The activity of his mind in a practical direction may be gauged from the fact that the number of patents taken out by him in less than half a century amounted to one hundred and fifty, many being of acknowledged public utility.

In 1874 Mr. Clark was elected fourth President of the Society of Telegraph Engineers, the subject of his inaugural address being the early history, the progress and contemporary development of electricity and telegraphy. This address is of exceptional interest by reason of the numerous references made at first hand to the rare works belonging to the very dawn of electric and magnetic science then in the President's possession. At the conclusion of the address, Mr. Clark made the important announcement that the magnificent collection of electrical works known as the *Ronalds Library* had been transferred, in trust, by Sir Francis Ronalds to the Society of Telegraph Engineers, so that "it be not dispersed but preserved in an entire state, and be of as much use as possible to such persons as from time to time should be engaged in the pursuit of electrical science or other cognate sciences."

Throughout his long life Mr. Clark, like his friend Sir Francis Ronalds, was an ardent bibliophile, ever ready to purchase an early or rare work connected with his favorite subjects which he might not already have in his collection. He was always on the alert for sales in the book-marts of Europe, regarding which his friend Quaritch kept him duly advised. With his love for books and with means to gratify it, he succeeded in forming a Library which for the number,

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importance and scarceness of some of the works on specific subjects, is unsurpassed in the world to-day. "I have been collecting everything I can find in all languages for forty-seven years," he wrote in 1897, the year before his death. "In that long time (during which I kept a skilled librarian) I succeeded in getting all English books both old and new. I also got a very large quantity of all foreign works, especially the rarer and older ones. In the line of pamphlets connected with early telegraphy my collection is quite unique, and comprehends 125 volumes. Although I still search catalogues, I rarely find anything that I have not got."

A few instances by way of illustration: Of the great encyclopedic writers of the 13th century, the Library has the magnificent folio edition of the *Speculum Naturale* of Vincent of Beauvais, printed in 1473; a *Sacro Bosco* (John of Holywood) *De Sphera Mundi*, 1478, the text expounded by Galileo at Padua; a black-letter folio of Albertus Magnus *De Anima*, 1494; Pliny's *Naturæ Historiarum Libri* xxxvii, 1497, with translation, 1634; Bartholomew de Glanville's *De Proprietatibus Rerum*, 1519; Friar Bacon's celebrated *Opus Majus*, written in the 13th century, and edited by Samuel Jebb in 1733; and Abbot Neckam's *De Naturis Rerum*, a work of the 12th century, edited by Thomas Wright in 1863.

The Library is exceptionally rich in tracts and treatises on the lodestone, the mariner's compass, and related subjects, from the early poems of Lucretius and Claudian to the letter which Klaproth wrote to Humboldt in 1834, and Berthelli's memoirs on magnetic history, 1868. To mention but

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a few: there is the *Epistola de Magnete* of Petrus Peregrinus, the first great landmark in magnetic philosophy, written in 1269 and printed at Augsburg in 1558, with translation, 1904; Blondus *De Ventis et Navigatione*, 1546; the *Breve Compendio de la Esfera* of Martin Cortes, 1551; Porta's *Magiae Naturalis*, 1558 and 1589, with translation, 1658; Gilbert's monumental volume *De Magnete*, 1600, with translation by P. Fleury Mottelay, 1893, and another by the Gilbert Club of London, with copious notes by Prof. S. P. Thompson, 1900; Norman's *New Attractive*, 1592—first edition 1581—containing an account of the author's discovery of magnetic dip in 1576; Borough's *Discourse of the Variation of the Compasse*, 1592—first edition 1581—in which we find the earliest published measurement of magnetic declination made on land, the credit of its discovery on sea and of its change with place belonging to Columbus, 1492; lastly, Gellibrand's *Discourse Mathematical*, 1635, which contains his discovery of the "secular" variation of declination. The "diurnal" change was observed by George Graham in 1722, and the "annual" by Jean Dominique Cassini some time between 1782 and 1791.

The idea of a region of force surrounding a magnet and the gradual development of this fundamental concept, may be traced in the Library from the elementary experiments recorded by Lucretius, 99-55 B. C., and the remarkable observations of Peregrinus, 1269, to the clear recognition by Norman in 1581 of the "Vertue in sphericall forme extending rounde about the Stone (lodestone) whose center is the center of the aforesaid Vertue," which spherical space was accord-

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ingly named *orbis virtutis* by Gilbert in 1600 and filled by him with rays of magnetic force, *radii virtutis magneticæ*.

From the annotations to the present bibliography, it will be seen that the Roman poet refers to the magnetic behavior not only of light iron rings, but also of iron raspings, *ramenta ferri*, while Peregrinus, and especially Gilbert, studied the nature of the force close to the surface of their terrellas by means of small magnetic needles. In 1629 Cabeo, a Jesuit of Ferrara and an investigator of remarkable ability, returned to the use of iron filings when, by plentifully sifting them over a fragment of lodestone, he obtained thick tufts at the polar ends with curved lines round the equatorial parts. The figure on page 316 of his *Philosophia Magnetica*, 1629, is the first representation of the kind that we have of the magnetic field, and as such is of special interest. Descartes extended this observation in 1650 by placing a number of small magnets symmetrically round a lodestone and noting the positions in which they settled down. The diagrams given by Descartes in his *Principia Philosophiæ* are remarkable, inasmuch as they show the continuity of the "lines of force" in the field with the lines of induction through the magnet. It is interesting to follow up this subject of the "magnetic spectrum" from Porta, Descartes, Rohault, and other early writers on magnetic philosophy to Faraday, who used the phrase "lines of force" in 1831, and Clerk Maxwell, who interpreted the "lines" mathematically in 1861.

The legendary history of the magnet as contained in the Library is abundant and amusing, including the *flesh magnet* with its extraordinary power of adhering to the skin and

even of drawing the heart out of a man; the *gold* magnet attracting to itself particles of the precious metal from an admixture of sand; the *white* magnet used as a philter; magnetic unguents of various kinds, one of which, when applied to a bald head, would make the hair grow; magnetic plasters for the relief of headaches; magnetic nostrums to cure the spleen and the dropsy, to quell disputes and even reconcile husband and wife. No less fabulous were the magnetic mountains of the North Sea to which the compass-needle was said to point, the magnetic island of the Indian Ocean which was capable of drawing iron nails from passing ships, and the suspension in mid-air of Mahomet's coffin, so often repeated by early writers on magnetic phenomena. Equally fictitious, was the pernicious effect on the lodestone of onions and garlic; and yet so widespread was the popular belief in this figment that sailors, while steering by the compass, were forbidden the use of onions and garlic lest they intoxicate the "index of the pole."

The diamond, too, played an interesting part in the evolution of magnetic theory, as a glance at the headings of certain chapters of some of the older books in the Library will suffice to show. It will be seen, for instance, that St. Augustine (354-430) records without, however, affirming that the diamond is able to rob the lodestone of its characteristic property of attraction; while, on the other hand, Porta (1540-1615) affirms that the same precious stone is capable of imparting magnetic qualities to iron needles. Gilbert (1544-1603)<sup>8</sup> who esteemed his Neapolitan

<sup>8</sup> For date of birth, see "The Family and Arms of Gilbert of Colchester" by Silvanus P. Thompson, F.R.S., p. 4.

contemporary as "a philosopher of no ordinary note," nevertheless suspects this view concerning the diamond to be little short of heresy, for he declares in *De Magnete* lib. iii, that he experimented with seventy diamonds in presence of many witnesses without ever obtaining the magnetic effect mentioned by Porta.

The same Gilbert denounces Pliny (23-79) whom he calls "the best of compilers" for giving currency in his "Natural History" to a magnetic fable concerning a stone said to be found in Ethiopia and called *theamedes*, which stone was credited by him with the power of repelling minerals containing iron, just as the ordinary lodestone has the power of attracting them.

The idea of using the magnetic needle for the transmission of intelligence is attributed to the celebrated Cardinal Bembo; but the credit of making this imaginary magnetic telegraph widely known belongs to his distinguished and versatile friend and countryman, Baptista Porta, who describes the manner in which two friends are supposed to convey their thoughts to each other in an instant over islands or continents, cities or mountains, ocean or desert, by means of a pair of "sympathetic" compass-needles having the letters of the alphabet written on a dial-plate around them.

If Porta were in a serious mood when he wrote this chapter of the seventh book of his *Magiae Naturalis*, his belief in the power of occult influences must have been at least as great as that of certain telepathists of our own day. This so-called telegraph of Porta attracted general attention during his lifetime and long after, as well it might, being such a canny con-

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ceit. It was disproved in 1609 by A. Boetius de Boot; celebrated in Latin verse by Famianus Strada in 1617—metrical translations by Hakewill in his *Apologie* 1630, and by Ward in *The Wonders of the Loadstone*, 1640; denounced in 1629 by Cabeo, who gives the first drawing of the telegraph on p. 302; railed at by Galileo in 1632; described in fine prose by Addison in *Spectator* 241 (1711), and in elegant verse by Akenside in Book III of his *Pleasures of the Imagination*, 1744.

References, descriptions, illustrations, approval or condemnation of the sympathetic compasses will be found in forty works in the Library, including the detailed account given by Daniel Schwenter (J. H. De Sunde) in his *Steganologia*, 1600, and an interesting form of the story by Glanvill in his *Scepsis Scientifica; or Confest Ignorance the way to Science*, 1665.

Anti-Copernican writers are strongly represented by Kircher, Cabeo, Schott, Riccioli, Leotaud, Grandami, Dechales and Scarella. The ponderous tomes on physical and cosmical science written by these men make one wonder that the system of the world put forward in 1543 by the Canon of Frauenburg, and based by him on rather slender arguments, had vitality enough to survive the blows dealt by such a galaxy of churchmen, mathematicians, and astronomers.

Gilbert, on the other hand, was a staunch advocate of the Copernican theory, which he sought to confirm by “new and unheard-of” arguments derived from his study of the laws and phenomena of magnetism which he carried on for twenty years in his workshop at Colchester. Having shown

by original experiments and some artful argumentation that the earth acts as a colossal magnet, he proceeded to infer that its revolution is due to a “magnetic compact” or “alliance” between the sun and the earth, for “the sun itself is the mover and inciter of the universe.” This magnetic theory of the movements of the various members of the solar system was, nevertheless, a very weak point in Gilbert’s armor which his continental opponents were not slow in detecting, and which, together with his errors on dip and variation, they assailed with all the bolts of their well-filled quivers. The cause of Copernicanism was not served, and Gilbert’s work fell into disrepute. The curious episodes of this anti-Gilbertian warfare make very interesting reading in the works enumerated above.

Verbal curiosities hastily gleaned from works in the Library would include the coinage of the term *affinity* by Albertus Magnus, *barometer* by Boyle, *gas* by van Helmont, magnetic *inclination* by Bond, electric *circuit* by Watson, electric *potential* by Green,<sup>9</sup> *galvanometer* by Cumming, *electromagnet* by Sturgeon, and *telephone* by Wheatstone. The term *electricity* occurs for the first time in Sir Thomas Browne’s *Pseudodoxia Epidemica*, 1646, page 51 and the plural noun *electricities* on page 79; *magnetism* occurs in Barlowe’s “Magneticall Advertisements,” 1616; while *Ηλεκτρούαγνητισμός, electro-magnetismos*, is the astonishing title which Father Kircher gives to a chapter of his *Magnes, sive de Arte Magnetica*, 1641, beginning on page 640.

<sup>9</sup> Laplace introduced the *concept* of the potential function into analytical investigations, but limited its use to problems in gravitation. Green gave the function its *name* and extended its application to electricity and magnetism.

The magnetic needle, when used by European navigators, was floated by means of straws, wood, or cork. Sometimes, too, it was laid across the edge of a light bowl which floated in water contained in a larger vessel. Abbot Neckam at the end of the twelfth century, wrote of a needle suspended on a dart (*jaculum*); Peregrinus introduced the double-pivoted needle in 1269; a filar mode of suspension was devised by Camillus Leonardus and described by him in his *Speculum Lapidum*, 1502. The copy of this work, which is in the Library, is dated 1610; the translation, 1750. *Stirrups* for suspending magnets appear on page 28 of Canon Tarde's *Usages du Quadrant à l'esguille aymantée*, 1638.

Two remarks of Bishop Wilkins may here be noticed. The first occurs in his *Mathematicall Magick*, 1648, and states that the "mariner's needle" may be used to steer a boat running under water—a fact which is well known to those who man our submarines. The second remark occurs in his *Mercury; or the secret and swift messenger*, 1641, and refers to a machine of which it is said: "When the friend to whom it is sent shall receive and open it, the words shall come out distinctly and in the same order as when they were spoken." This is a near approach to the mechanical reproduction of sound by our modern phonographs.

Another illustration of the aphorism *nil sub sole novi*, will be found in a passage of the *Philosophe sans Prétentions, ou l'homme rare*, published in Paris in 1775, in which the impact of light or the pressure due to radiation is used for the purpose of doing mechanical work. The words of "D. L. F.," the author, are: "Observez que la percussion de la lumière

agit actuellement au-dessous de ma méchanique, c'est elle qui va m'enlever sans beaucoup d'efforts," p. 32. The work was, of course, one of pure imagination.

Of the beginnings of electricity, copious references will be found to amber and jet and their attraction for straws, chaff, and light bodies. The first original work of any extent on the general subject is Book II, of Gilbert's *De Magnete*, 1600, which, though abounding in original experiments on electrical attraction, makes no mention whatever of electrical *repulsion*. It stands out as a singular fact in the history of electrical discovery that an experimenter of Gilbert's diligence and ability should have failed to detect the mutual action of similarly electrified bodies, the discovery of that capital effect being reserved for Cabeo, who carefully describes it on page 194 of his *Philosophia Magnética*, 1629, the description being here reproduced.

Apropos of nomenclature, Robert Symmer recognized in his *New Experiments and Observations*, 1760, that "negative electricity is in reality a *positive*, active power," a remark which appears to be justified by the activity and energy of our contemporary electrons, or atoms of electricity, as well as by a number of other electrical phenomena.

The evolution of the Leyden jar may be studied in the works of Winkler, of Leipzig, and Musschenbroek, of Leyden, and notably in the letters which Franklin wrote to his friend Collinson, of London, 1747-49. It is sometimes stated that Franklin was the first to ignite gunpowder by means of the electric spark, and that he did so in June, 1751. This is an error, inasmuch as Dr. Watson describes, in his

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*Experiments and Observations*, 1746, page 40, a method which he successfully employed for firing gunpowder. Watson's book was well known to Franklin.

The development of the electrical machine may be followed from the sulphur-ball of von Guericke to the glass-globe of Newton, the glass-cylinder of Andrew Gordon, the Benedictine, the plate-machine of Martin de Planta of Sus in Switzerland, 1755, and the double-cushion plate-machine of Sigaud de la Fond, 1756. It will be seen that Winkler, of Leipzig, substituted for the palm of the hand—which was the rubber of early times—a *leather cushion*, which Canton afterwards covered with an amalgam of tin and mercury, thereby greatly increasing the output of the machine.

Among Galvani's predecessors the first place belongs to the celebrated Dutch naturalist, Swammerdam, who describes in his *Biblia Naturæ*, page 839, experiments which he made in 1658 in presence of his munificent patron the Grand Duke of Tuscany, and in which he obtained muscular contractions of *frogs' legs* by using a pair of silver and copper wires.

Analogous experiments were made in 1784, and published in 1786 by Cotugno, professor of anatomy in the University of Naples, to the effect that he felt a benumbing sensation in his hand while dissecting a mouse which had bitten one of his students; but it was not, however, until Galvani published in his *De Viribus Electricitatis*, 1791, an account of experiments which he began in 1786, that the subject of "animal electricity," as it was called, commenced to attract serious attention.

Among Volta's predecessors should be reckoned Sulzer,

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the Swiss æsthetical writer who, in a paper which he sent to the Berlin Academy in 1760 entitled *Theorie der Angenehmen und unangenehmen Empfindungen*, and which was published in 1762, notes the peculiar taste produced when strips of lead and silver, lying one above and the other below the tongue, are momentarily brought into contact. See also Sulzer's *Nouvelle Théorie des plaisirs*, 1767, page 155.

Nor should Professor Robison, of Edinburgh, be forgotten, who, in 1793, constructed what he called a *rouleau*, and which was nothing else than an early form of an electric column, or "pile." "I had a number of pieces of zinc," wrote Robison to Richard Fowler, "made of the size of a shilling, and made them into a rouleau with as many shillings. If the side of the rouleau be applied to the tongue so that all the pieces are touched by it the irritation is very strong and disagreeable."<sup>10</sup>

In 1802, two years after the invention of the voltaic pile, Romagnosi, of Trent, just missed discovering the magnetic effect of the electric current. In his letter, which appeared in the "Gazetta," of Trent, August 3, 1802, he says that he connected one end of a silver chain to a battery; and having passed the other, terminating in a little knob, through a glass tube for the purpose of insulation, he brought the knob close to the extremity of an insulated compass-needle, when he noticed that the needle was attracted and, after contact, repelled.

Govi gives the letter textually in his paper, entitled: *Romagnosi e l'Elettro-Magnetismo*, 1869, remarking that the

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<sup>10</sup> Fowler: "Experiments and Observations," p. 173. See also Encyclop. Brit., 1860, Vol. i., p. 963.

attraction and repulsion said to have been observed by the experimenter, were electrostatic and not electromagnetic effects.

Mojon, an eminent professor of chemistry of Genoa, was also on the verge of an epoch-making discovery, when, in 1804, he placed steel needles for a period of twenty days in circuit with a battery of one hundred elements of the crown-of-cups type, and observed that they were permanently magnetized when removed from the circuit. See Izarn, *Manuel du Galvanisme*, 1804; also Aldini, *Essai théorique et expérimental sur le Galvanisme*, 1804.

Both Romagnosi and Mojon, however, failed to follow up the pregnant experiments which they made, thus leaving the field clear for Oersted, of Copenhagen, to announce to the world the discovery of the magnetic effect of the electric current, which he did in his pamphlet of four quarto pages printed in 1820 under the title "Experimenta circa effectum conflictus electrici in acum magneticam," a copy of which is in the Library. This capital discovery of the Dutch philosopher led Arago in France and Davy in England to magnetize steel needles by inserting them in a coil of wire conveying a current. Sturgeon, in 1825, replaced the hard steel by soft iron, and was thus the first to make an electromagnet as we know it to-day. He also applied the term *electromagnet* to the apparatus itself, a term which was adopted at once.

The student of the mathematical theory of the electrical current and its dynamical effects will be glad to have at hand Ampère's papers, 1820-25, which contain a masterly analysis of the phenomena; Ohm's "Galvanische Kette," 1827; and Green's "Essay on the application of mathematical analysis to

the theories of electricity and magnetism," printed at Nottingham in 1828. In the opinion of Mr. Clark, this Essay is "one of the most important works ever written on electricity." Copies of this (first) edition are extremely rare.

The older modes of transmitting signals by lanterns, flags, and semaphores, are fully described by the inventors of the various systems whose works are in the Library. An illustration of the scant encouragement which inventors frequently receive from people in high places will be found in the letter which Mr. Barrow wrote to Ronalds, and in which the representative of the British Government says: "Mr. Barrow presents his compliments to Mr. Ronalds and acquaints him with reference to his note of the 3rd inst. that *telegraphs of any kind are wholly unnecessary*; and that no other than the one in use will be adopted." Mr. Barrow must have forgotten when penning these lines how efficiently his mechanical telegraph worked when the result of the battle of Salamanca (July 22, 1812) was semaphored from Plymouth to London, on which occasion the message was interrupted by a fog after the transmission of the first two words, viz., "Wellington defeated." The remainder of the dispatch, "the French at Salamanca," reached the capital only on the following morning.

It must be stated that Ronalds was not the first to use static electricity in 1816 for the transmission of signals, for such a mode was suggested in the *Scots Magazine*, 1753, and carried out in 1774 by Lesage of Geneva. On page 273 of the present volume will be found a facsimile reproduction of a letter in which Ronalds refers to a proposal made in

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1777 by Volta to use his electrophorus as an instrument for the transmission of signals to a distance.

As to the use of the electrical current for telegraphic purposes, information may be found in the Library on the early systems, including that of Soemmering of Munich, 1809, whose electrolytic receiver consisted of as many small voltmeters as there are letters in the alphabet. Following the discovery of the magnetic effect of the current by Cœrsted in 1820, Ampère showed how the deflection of a common multiplier could be used for sending signals. In 1830, Schilling of Göttingen constructed a receiving instrument with five vertical needles, and another in 1835 with a single needle. It was one of these that W. Fothergill Cooke saw in Heidelberg in 1836 and which suggested to him the Cooke and Wheatstone apparatus of 1837. Reference should also be made to the operative bell-signal telegraph of Henry, 1832, and the needle telegraph of Gauss and Weber, 1833.

Professor Morse turned his attention, as we are told, to the subject of electric telegraphy in 1832; but it was not until 1837 that an experimental demonstration of his system was given, in which year Edward Davy publicly operated a needle-telegraph in London. The first line in the United States was opened between Baltimore and Washington in 1844, whereas the first line for public service in England was in operation between Paddington (London), and Drayton, in 1839.

Of books, pamphlets, and documents relating to land and submarine telegraphy few of any importance escaped Mr. Clark's attention. "During the first thirty of the forty years I was collecting," wrote Mr. Clark, "I secured every elec-

trical work that was published in England (including pamphlets), besides all I could hear of that were published in foreign languages. I was so lucky, too, in digging out the old books, that I can boast of possessing nearly every English work on the subject up to 1886 or 1888, after which they became painfully numerous. I have all the few very scarce and interesting sixpenny and shilling pamphlets which appeared when the telegraph first came into existence—they are now extremely rare. I have also, I think, all the scarce old histories and treatises on the magnetic needle by English and foreign writers, some of which are very interesting."

One instance by way of illustration: the pages of *L'Illustration* for August 26, 1854, contained an article by one Charles Bourseul, of Paris, in which he claimed that the *spoken word* could be transmitted to a distance, say from Paris to Vienna, by a method which he devised involving the use of a battery, a pair of metallic plates, and connecting wires. His apprehension of the fundamental principle of the telephone was clear and accurate, and his brief description of it very much the same as we give to-day. "One person," he says, "will have to speak to one of the plates while the other holds the second to his ear, thus enabling the former to converse as if in private with his distant friend." "Quoi-qu'il arrive," he prophetically concludes, "il est certain que dans un avenir plus ou moins éloigné, *la parole sera transmise à distance.*"<sup>11</sup>

It does not appear, however, that this system of telepho-

<sup>11</sup> Details of the invention will be found in Du Moncel's "Exposé des Applications de l'Électricité." Vol. iii., p. 110. Bourseul died in 1907, and for some years previously had received a pension from the French government.

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ning, which antedated the experiments of Philipp Reis by seven years, and those of Graham Bell by twenty-two years, was ever put to any practical test. Reis called his instrument the *telephone*, though the term had been used by Wheatstone twenty years before.

An account of Bourseul's invention appeared in the *Didaskalia*, of Frankfort-on-Main, on Sept. 28, 1854, a translation of which, accompanied by remarks, was sent by Mr. Clark to the London *Electrician*, in the columns of which periodical it appeared on October 28, 1890.

Besides telegraphy and telephony, the early history of insulation and insulators, of electro-deposition and electro-magnetic motors, is well represented in the Library.

Reference to the Clark collection was made in the *Journal of Proceedings of the Institution of Electrical Engineers*, 1899, in these words: "The Library, so far as electrical works are concerned, is unequalled. There are few, if any, works of importance missing. All are preserved and bound with the lover's conception of appropriateness and permanence, and, in many cases, they have valuable annotations regarding the significance of the facts disclosed in them."

It was Mr. Clark's wish that this valuable collection of his should eventually be transferred to the United States, inasmuch as London was already in permanent possession of the Library of Sir Francis Ronalds. Failing an American purchaser, it was to go to Japan, "a rising country which would greatly value such a unique collection." Thus wrote Mr. Clark to Mr. P. Fleury Mottelay, of New York, on February 21, 1898, eight months before his death.

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But fortunately for us the Library did not go to the land of the Rising Sun, for, thanks to the commendable public spirit of Dr. Schuyler Skaats Wheeler, it found a home in our metropolitan city.

Mr. Clark was not only an ardent collector of electrical works, but also a careful reader, annotator and critic of the books which he purchased. This gave him a rare acquaintance with the history of electrical science, which led him at different times to correct certain errors of chronology and to assign credit where it was not usually given.

When we say that Mr. Clark was a methodical and indefatigable worker, we have said enough to account for the professional, scientific, and bibliographic work which he accomplished. Though he had passed the threescore-and-ten limit, he was at his office in Westminster on Friday, October 29, 1898. This was, however, destined to be his last visit; for, on his return home, he was taken suddenly ill; and complications following, he breathed his last on October 30.

Mr. Clark was a man of uniform temperament and amiable disposition, respected far and wide for his personal qualities as well as for his engineering and scientific achievements. He had a keen appreciation of character, and was able to grasp the salient points of a question promptly. His works reveal the diligent and painstaking student; his historical criticisms and appreciations show wide research; his accuracy recalls the sixth decimal of the chemist and physicist.

In the preparation of the annotations which follow, an effort was made to draw attention to all matters of primary importance, especially in the earlier and rarer works; some

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must, however, have escaped the notice of the writer, while others may have been crowded out by the limits imposed.

To Mr. Lyonel Clark, we are indebted for several communications relative to the Library, for which we offer our acknowledgments.

The writer acknowledges with gratitude the help that he received throughout the preparation of this volume from Mr. W. D. Weaver, chairman of the Library Committee, the uniform courtesy of the members of that committee, and also the helpful remarks made on reading the proofs by Dr. Hellmann, of Berlin; Prof. Silvanus P. Thompson, of London; Mr. A. W. Pollard, of the British Museum, and Mr. P. Fleury Mottelay, of New York, whose "Chronological History of Electricity and Magnetism" shortly to appear in book form, was also of assistance.



SECTION I

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Main Portion of Collection



## SECTION I

### Main Portion of Collection

1. **Vincentius, Bellovacensis** (Vincent of Beauvais.) (1190-1264.)  
Speculum naturale. One vol. in two parts. Two columns to page, 66 lines to column. 367+327 l. Folio. Argentorati [“The peculiar *R* printer” (Adolph Rusch?)] Strasburg [1473]  
Part of a famous encyclopaedia of the Middle Ages; other volumes of which were entitled “Speculum Morale,” “Speculum Historiale,” and “Speculum Doctrinale.” Book v.: Thunder, ch. 55; lightning, ch. 59; shooting-stars, ch. 72; rainbow, ch. 74. Book ix.: the magnet in general, ch. 19; magnetic quotation from St. Augustine, ch. 20; uses of the magnet in medicine, ch. 21; a species of “adamant” (magnet) useful in navigation for directive purposes (mariner’s compass), ch. 40. As in the case of many early incunabula, no title page was printed. The date 1468 has also been assigned to the present edition. This monumental work was printed no less than ten times between 1468 (?) and 1497. (See No. 1349, Bourgeat.)

2. **Sacro Bosco, Joannes de** (John of Holywood.) (13th century.)  
Spera mundi feliciter incipit, 29 l. ill. 4to. Venezia, per Adam de Rottueil. *Venice, 1478*  
The first edition of this very rare work on astronomy appeared in 1472, and continued to be the standard text-book on the subject for a long time. No reference is made either to the lodestone or to amber. Sacro Bosco, educated at Oxford, was professor of mathematics in the University of Paris some time in the 13th century.

2a.— —Sphaerae mundi compendium foeliciter inchoat. 48 l. ill. & 1 pl. 4to. Venetiis, Octavius Scotus. *Venice, 1490*  
Commentary on part of Ptolemy’s Almagest; a favorite manual with the Schoolmen; no reference to the magnet.  
—See also 17.

3. **Albertus Magnus.** (1205-1280.) De anima libri iii. De intellectu et intelligibili libri ii. 2+68+71+3+73+1 & 1+23+5+124 l. Folio. Venetiis, per Joannem de Forliuio et Gregorium fratres. *Venice, 1494*  
In addition to the above treatises on the soul and the intellect, this work contains four books on meteors and eight books on physics: thunder, meteors, book iii, p. 35; magnetic attraction, book vii, p. 96, and book viii, p. 113. Albert the Great was a Dominican and Bishop of Ratisbonne. Copies of this beautiful edition are very rare.  
—See also 6, 8, 19. 140.

Incipit speculum naturale Vincentij beluacensis  
fratris ordinis predicatorum. Et primo: plogus &  
causa suscepit opis et eius materia. ¶ Primum.

**O**portet studio legere  
tum est tandem (accedete etiam maiori meoz  
cofilio) quosq; flores p modulo ingenij mei ele-  
ctos: ex omnibus fere quos legere posui. sive no-  
strorum. i. catholicorum doctorum: sive genitium scz  
philosophorum et poetarum: ex vnuq; historicorum  
in vnu corpus volumis quodam compendio et or-  
dine summatim redigere. Ex his ducatur pincipiū q  
primitur: vel ad fidem nostre dogmatis astruc-  
tionē: vel ad modū i structionē: sive ad exercitā  
caritatis devotionē. Aut diuinarū scripturarū mi-  
sticam expoficē: vel etiā ad ipsius veritatis ma-  
nifestaz aut simbolicā declaratōem. ut et studio  
meo quasi moē quēdā imponēt curiositatē mee:  
teterorūq; nō nulloz fideiāt mei similiū: quorū  
studii et laboris plorūm legere: eorūq; flores  
excerpere: per hoc vnu grāde op: vnuq; latifia  
cerem: et laboris mei fructū pōtētibus nō nega-  
rem. Siquidē faciēt plures liboz nullus est li-  
nis: et curiosi lectoris nō faciat oculus vnu: nec  
auris impleat auditi. Ad istud ipz p̄sucauit me  
plorūm fuitas vel ambiguitas quaternoz: i q  
buo autoritatis sanctorū adeo plorūq; mendacio-  
ter a scriptoribus vel notariis iniculabancē eū  
scribēbant: ve que heu ſila vel cui? autoris eēt  
oīno nescire. dū (obi gratia) que augustinus vel  
hieronimus erat: auct̄ribat̄ ambicio vel gregorio  
vel ysidoro vel econtra. Aut verborū aliqua par-  
te dempta vel addita vel mutata sensu autoris  
corrumpebat̄. Sic et de oīclis p̄borz aut poētaz  
sic de narrationibz historicoz hebat̄ dum vnu  
nomen pro alio fumbatur. vel dicitur veritas  
simplicer euerterebatur.

**I**terum alia cauſa.  
**U**erbā p̄terea (iuxta danielis p̄pheiā)  
tempibz nostris nō tantummodo secula  
nūm literari: verū etiam diuinarū ſcri-  
peharū obiq; multiplicatā eſe ſcientiā. Omnes  
qz p̄cipue fratres nostros aliud ſacrorū librorū  
historiā ac mificio expoſitōibz: inſup et obſer-  
vatoribz questionibz enodāois inſtrū. Inē hec  
autez historias ecclesiasticas quarū lacte paſceba-  
tur antiquoz ſimplicatibz: quodammodo viluſiſt et  
in negleſtūm veniſſe. Cum tamē nō ſolum vnuq;  
voluptatis ac recreationis ſpūs: verū etiam eōſi  
catōnū plurimū ſe ſcīmēat̄. Et p̄ primū qdaz  
ecclēſie naſcentiā infantiam i aploſ describēbant:  
quos ipſe domīnū tanḡ māter filios et tanḡ gal-  
lina pullos ſub alarū fuarū delicioſe educauit &  
ſouit. Deinde vero eandoz ſpiritu oīis ſui virtutē

inducat̄: & quaſi iam in robuſtissimis erat̄ p̄  
uetat̄: nō ſolū in ipis aploſ ſed etiam in ceteris  
mārtiribz eoz ſequacibz p̄ duodecim p̄ſequitio-  
nū tempa tribulationibz expoluit. eiusq; patiē-  
tiam in illis exercuit. Post hec autem conſumata  
victoria ſez p̄dicitōrum ſanctorū iamq; pace p̄ cō-  
ſanciū ecclēſie rediit: pullulantibz iterū diā-  
ſis heretibz videlicet artiana: donatianana: pēla  
giana & ceteris: Sicq; ad rediuita bella ipam ec-  
clēſia: p̄uocantibz. Ve quā gloriū non vicerat  
verbōrum fallacia ſubuerteret. Iphos itaq; here-  
ticos p̄ doctores ſuos catholicos videlicet Abana-  
ſu Hilariū Baſiliū Ambroſiū Hieronimū Au-  
gustinū et ceteros: obis et ſcriptorū ſtātēr re-  
uicta: eiusq; ſapientia: ac ſi iam p̄fecte erat̄ eſſe  
iis exauicti et elauit̄. Deniq; post huiusmodi  
trūphos ecclēſia quaſi iā emerita in pace ſequi-  
dum in ſanctis p̄fessoribz anachoritac et mona-  
chis in egypto et syria ceterisq; locis oīibz p̄bāti-  
bus: ad celestem et ſtemplatū vitā ascendit: ſi  
mulq; ſanctorū ducēs angelicā ſimilitudine viuē  
di vberimā exempla reliquit. Hee & alii plura  
ſ illis historiā ſtilia ſimilis & delectabilis cernēs:  
plorūq; ſratuz noſtrorū huiuscemodi rei igna-  
tis conficiens: ipſi as etiā ſicut de cetera de di-  
uī ſiutoribz uoligēt̄ excepēt̄ ſe p̄colli: acq; ad  
certū ordinē tempum cūcta redēgi. ¶

De modo agendi & titulo libri.

**C**ū m auez apud me ſollicite ac ſtudioſe  
inquiererē: quoniam modo vel ordine cū  
cta i vnu corpus aprius cōpingerem:  
cernens ſi diuerſorū ſententiā ad eandē mate-  
riā genitētē (ve fieri ſoleat) p ſingulos titulos an  
notarem (Verbi gratia) ſub vnu titulo ſententiā  
& exempla de caritate: ſub alio de castitate ſic de ſie  
de ceteris ſtūtibz & vnuq; ſigillatim trāclādo p  
cederem: totam vnuq; rerum naturā quā nichilo  
mīm: deſcribere diligēt̄ p iſpolui: neceſſario ab  
hoc opere nō excluderem: necnō et de ordine p̄  
tius historie nō parum utilitatis & pulchritudis  
habentē omīnō ſtūderem & euerterem. Conſi-  
deratis omīnō ſpēcentētēm p̄cedendi modūz  
nullaten? reperi ſi iſtū (que p̄ cunctis elegi) vi  
delice ut iuxta ordinē ſacre ſcripture: p̄imo de  
creatore: poſtea de creaturis: poſtea quoq; de la-  
pſu & reparatiōne homis: Deinde vero de rebus  
geliſi iuxta ſerius tempū ſuoz ordinatē dille-  
rem. In fine vero tōtū ſopena ſingulaz eiſ p̄teu-  
laſ ad idem genitētē ſingulaz materias quibz  
daz titulus & noēulis ſcoſorā. Deniq; quo nīā  
ve ſupius dicitum eſt ex diuerſis auto ſibus hoc  
opus extētum eſt: ve ſciat̄ quid ſit: ſingu-  
loz dicit̄ eoz noīa annotat̄: ac ne facile  
transponerēt̄ de locis p̄pī: nequāq; i margini  
ne ſicut i pſalterio gloſato & epistolis pauli  
& in ſententiis: ſeo ſter lineas ipas (ſicut fecit ḡ  
dian? in compilatiōne canōnū) ea inſtrū. In eordō  
etiam ea que ipſe vel a maiozibz meis ſez moder-  
nis doctozibz diuici: vel in quorundam ſcriptis  
notabiliſ ſeppi: nomē meo id eft autoris ſtīcu-  
lari. Illud autē lectorem non lateat̄: nō ſola in  
hoc opere maix que de gelis ſanctorū mārtirū  
& confessorū nō ita penitus abbreviata eſſe: ut  
volui: quia nimīrū alio quoq; ſtūdij p̄ obediāz  
interdum occupatus & memē: non omīa manu  
p̄pī: ſeo plorāq; p̄ man? notarioz abbreviati.

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4. **Plinius, Caius Secundus.** (23-79.) *Naturae historiarum libri xxxvii, e castigationibus Hermolai Barbari quam emendatis-sime editi.* 254 l. Large folio. Venetiis, per B. Benalium. *Venice, 1497*  
 Celebrated work on natural history; references to thunder and lightning, book ii., ch. 45; rainbow, book ii., ch. 61; the lodestone, book xxxvi, ch. 16.

4a.— —English translation by Philemon Holland, 2nd edition, vol. 1, Folio. London, A. Islip. *London, 1634*  
 Statue in mid-air, 575; Ethiopian repelling magnet, 587; the lodestone, 587.

5. **Leonardus, Camillus.** (Flour. 16th cent.) *De sestertio pecunii pond-eribus et mensuris antiquis, libri duo.* 36 l. 4to. (1510?)  
 Treatise on ancient moneys, weights and measures.  
 —See also 54, 83.

6. **Albertus Magnus.** (1205-1280.) *De natura locorum Librum mira eruditione et singulari fruge refertum et jam primum summa diligentia reuismum, in lucem editum quem leges diligentius si uel cosmographia uel physica profecisse te uolueris.* Viennae, Austriae. 52 l. Sm. 4to. *Vienna, 1514*  
 Tract on physical geography. Ch. v. contains reference to magnetic attraction and repulsion; ch. vii., to the flesh magnet and magnetic mountains, both of which were magnetic myths. Scarce.  
 —See also 3.

7. **Cusa, Nicolaus de.** (1401-1464) *Haec accurata recognitio trium voluminum operum.* 3 vols. in 1. Folio. Parisiis, ex officina Ascensiana. *Paris, 1514*  
 Very rare work of the learned Cardinal, containing references to the attractive power of the magnet, vol. i, fol. 96, and vol. ii, fols. 86, 123, 125. This work contains description of first known *hygroscope*.

8. **Albertus Magnus.** (1205-1280.) *De mineralibus* - - - libri quinque. 57 l. 4to. Augustae Vindelicorum. *Augsburg, 1519*  
 The author quotes Aristotle freely, refers to the lodestone, and alludes to the danger caused by submerged magnetic rocks to ships containing iron nails. In Book ii., tract 3, ch. vi., he quotes Aristotle to the effect that some lodestones attract gold, silver, copper and tin, while others attract the *flesh* and *bone* of man—one of the current magnetic myths.  
 —See also 3.

9. **Glanvilla, Bartholomaeus de.** (14th century.) *Opus de proprietatibus rerum.* 192 l. Folio. Nuremberge, Joannis Koberger. *Nuremberg, 1519*  
 Cyclopaedia which was very popular in the 14th, 15th and 16th centuries; the author was a Franciscan friar and member of the family of the Earls of Suffolk. He wrote about 1250. The first edition with a date appeared in 1480. The book was translated into most European languages. Book xvi, ch. 63, contains references to iron rings suspended from a magnet; a statue suspended in mid-air by magnetic attraction (a myth). Book xi., ch. 13, treats of thunder, and ch. 14, of lightning.

10. **Augustine, Saint.** (354-430.) *De civitate Dei.* 11 l.+787 pp. Folio. Basileae, apud J. Frobenium. *Basle, 1522*  
 The author of this famous work describes on p. 714 how a scrap of iron resting on a silver dish follows a lodestone moving under the dish; p. 720, a lodestone attracts iron but not straw; p. 718, in a certain temple (of

infinitum motum esse: non eundem quidem numero: sed alterum post alterum: et alterum cuj altero fin numeri infiniti mouentur: et eoz que mouent: ita q mul ta et infinita sine motu sequentur: et simul habentia motu: sicut etiam accidere videatur in his que nunc dicta sunt: ergo forte respondebit et infinitus nobis aliquis. Sed contra hoc dicimus q si nos supponamus finis sua predicta: q id quod mouetur primus et mouet alia fin loci corporalē mouentur: necesse est q omne quod mouetur quod necesse est: et tāgū: et per cōsequētē cōsūmū esse suo mouēt quod mouerit supponitur: et q si mediatis ens id aliquod ipsius tangat: et tactus in materia thematicis et in publicis ordinat ad vnu: sicut videm⁹ contingere in omnibus phisice mouentibus et motis: tūc possiblē erit q ex omnibus vel infinitis que mo uetur a se inveniēt supponamus fieri vnu: aut coringens aut continuū: q si non superius iam dicimus q nos non loquimur hic de mobili prato ad materiam: et ideo eius dicimus sup: q omne mobile est diuisibile: non tamē elementū q est mobile est et nō si diuisibile: q diuisibile est elementū fin q est mobile: non tamē diuisibile fin q et hoc mobile ad materiam contractū: et ita dicimus q omne mobile inquantū mobile conti nuabile est q omni mobili inquantū est mobile: et si ac cipiat continuū cū ipso nūl obet sequi impossibili⁹. Accipitamus igitur q inīgat vnu fieri corpus ex omnibus illis que possumus esse infinita: et si illi ma gitudine sive continuū infinitū signatur per a. b. c. d. et motus enī congregantur ex omnibus motis particula rīs continuoꝝ sive signatur per e. f. g. h. et nō est differē tia quo ad propostū nostrū: sive sūt quilibet magnitudi no dilatula sūta: sive infinita: cū modo infinitē ponte fin numerū: q si numero sive alio modo sive copiōtē est infinitū quod cōponit ex infinitis per numerū: sive sūt infinita fin ultima: sive finita: sicut etiam in publicis est ostentum. Quidam fin vnu similitudinē quodcāq istoꝝ ponatur q in tēpore finito moue bitur infinitū quod in cōponētib⁹ fin ultima: aut est finū: aut infinitū: licet numero componitātē tempore sive infinita: et virtutis hoc est impossibile: sicut in sexto de claratā est: ibi enim probauimus q motus infiniti est infinitus: et q motus vnu est essentiale habet diuisioneꝝ fin diuisione eius quod mouetur: et tunc eius quod est infinitus in cōponētib⁹ fin ultima: aut non finitur transitus eius. Cū igitur impossibile sit motum hoc modo infiniti esse in tempore infinito: et sequitur hoc ex illa positione que dicit abire in infinitū: si vnu ponitur mouerit ab alio. Necesse igitur est ergo q statib⁹ aliā quādō si vnu mouetur ab alio: ita q aliquod sit primū mouene: ita q ipsū ab alio nullo mouet: oportet igitur per illam rationē esse aliquod primū quod mouetur a mouente primo. Si autem forte aliquis dixerit q ista demonstratio non valeat: q si nō cōcludit sim pliciter: sed concessō quodā falsō: hoc est q oīa mouētia et mota cōtingentur: vel cōtinuū p̄dēcūm⁹ q non impedit nostram demonstrationē: q licet hoc sit falsum fin corpora publica in specie et forma accepta: tamē est possiblē et cōtingens fin genus mobilis inq: tū et mobile ut dicimus. Quādō autē possiblē et cōtingens supponit licet sit falsum nūl obet sequi impossibile: hoc autē sequitur impossibile: et ideo nō seq/ tur hoc ex assumptione falsō: sed potius ex positione illa qua ponitur abire in infinitū q vnu semper moueretur ab alio. Et etiam aduertendū q cum nos in tali ordine mobilium et motorum probauimus esse aliquod pri-

sum mouētia non intelligimus hoc de primo quod est finis mouētia intentionē efficientis: quia finis est causā causa sit totum quod sit ab efficiente: sed intelligimus de primo quod est efficientis unde est principiū motus qd mouet et operat ad hoc q motus fiat: et cu/ lus actus est motus in eo q motus. Hic enim mouēt si mul tēpore et mouēt cū eo qd mouet: ita q nūl est mediū ipsorum: hoc enī vnu est q. s. talis motor imedia tus est ei qd mouet in omni eo qd mouet et mouēt: et hoc vocant quidē esse locū ex loco: qd in cōdeꝝ loco: et vbi est motor: et id qd mouet nūl est me diū in omnibus modis motus localis.

Uia autē nos in demonstrātō predicta sup

q possumus ex oīa motorib⁹ et motis si in

genere considererent fieri vnu: et hoc non pot est esse nisi immedia sit motus et id qd mouet: ita q inter eā nec plenum sit: nec vacui: oportet nos hic determinare q inter motorē et id qd mouetur ab ipso nūl sit mediū fin omnē motū in genere. Quia autē per se ma nifestū est q inter generans et generatū et proximū nūl est medium: qui virtus formaturia que est proximū generans est in feminē: ideo nō oportet nos mul tum sollicitari ut probemus in generatō corrupcio ne que est generationē contraria: sed nos probabimus hoc in his in quibus est occultū. Quoniam autem tres sunt motus per dicimus in quinto: quorum vnu est fin quilibet locū: et alter fin qualitatē: et tertius fin qualitatē. Necesse est etiam q ea que mouentur mo uent ad res triū generū: et necesse est motus res esse fin generā. Motus igitur qui est fin locū est loci mu tatio: qui non fin qualitatē est alteratio: que non fin quantitatē est augmentum vel detrimentum. Dicā: tuus igitur plūmū de loci mutationē: hic est enim fin naturū plūmū motus: sicut probauimus in octauo huius scientie. Dicamus igitur q omne illud quod fertur fin locū: aut mouetur ipsū a seipso: aut ab altero quod est extrinsecus ei. Si autem mouetur a seipso sicut animalia mouentur: vel per se videntur moueri sicut elementā: tunc manifestū est q motus simūl cum talibus et in seipso mouentibus habent in se mouētia: et ita simūl erit mouētia et quod mouetur: ita q inter ea nullum est medium: neq̄ probatum: neq̄ vacuum: quia cum in principio libā probatum sit q omne quod mouetur habet motorem: oportet et q il lud quod mouetur et non habet motorem: extra: ha beat eum in seipso: et ita habet cum coniunctū sibi: et ne medio. Quod autē mouetur ab alio mouetur qua dratice: omnes enim motus violentiū q motorē ba bent extra: ad quatuor modos communes reducuntur. Modū autem illi sunt vocati pulū: trāctio: et ve cto: et vērtigo. Omnes enim alios modos motus vlo lenti necesse est in hoc reduct: et contingere aliam rationē istorum: sicut inferior ostendemus. Pulū autem diuisidit in duos modos speciales: quedā enim pulū est impulsio: et quedā vocatur expulsio. Et impulsio quidē est quando id quod mouetur non deficit ab eo quod impelliū: sed corporaliter coniungitur ei per totum spaciū: et per totum tempū impul sionis: sicut si manus superposita super lapidem lapidem impellat ita q manus a lapide non separetur: et tunc manifestū est q mouētia et motus coniunguntur sine medio. Alius autem motus pulūstio est ex pulū. Et expulsio autē est quando pellētis osīcī ab eo quod pellitur: et hoc est quando primū tangēt mouētia

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Alexandria) lodestones were fixed in the roof so that an iron statue remained suspended in mid-air. This is one of the magnetic myths that enjoyed currency for many centuries. (See No. 47b.)

11. **Vegetius**, Renatus Flavius. (4th century.) *De l'arte militare.* Novamente tradotta. 99 l. 16mo. Vinezia, per B. di Vitale. *Venice, 1524*

Early work on military tactics; no reference to electric or magnetic matters.

12. **Marbodeus**. (1035-1125.) *De lapidibus pretiosis enchiridion, cum scholiis Pictorii Villengensis.* Eiusdem Pictorii de lapide molaris carmen. 55+1 l. 12mo. no pl. (Parisiis, C. Wechelus.) *Paris, 1531*

Collection of Latin poems principally on gems. Two of them are of special interest, viz: the one on *jet* beginning folio 28, and the other on the *lodestone*, fol. 41. An English translation is printed in King's *Precious Stones* (London, 1870). Marbodeus (Marbœuf) was Archbishop of Rennes in Brittany.

—See also 40.

13. **Finaeus**, Orontius. (1494-1555.) *Protomathesis: opus varium ac scitu non minus utile quam jucundum nunc primum in lucem feliciter emissum.* 8+207 l. ill. Folio. Parisiis. *Paris, 1532* Treatise on arithmetic, geometry and cosmography. The last part of the work treats of the construction of clocks. The illustrations are numerous.

14. **Peurbach**, Georg von. (1423-1461.) *Novae theoriae planetarum.* 40 l. ill. 12mo. Venetiis, per Melchiorem Sessa. *Venice, 1534* Pamphlet on the motion of the planets highly considered in its time.

15. **Stoeffler**, Johann. (1452-1531.) *Variorum Astrolabiorum compositio seu fabrica neenon eorundem usum ac variarum utilitatum explanatio.* 81.+77 l. ill. Folio. Moguntiae, P. Jordan. *Mayence, 1535*

Compendium of astronomy printed eight years before the death of Copernicus.

16.\* **Mela**, Pomponius. (Flour. 1st cent.) *De situ orbis, libri tres; cum annotationibus Petri Joannis Oliuarii Valentini, 110 pp.* Lutetiae. Ex officina Christiani Wecheli. 12mo. *Paris, 1536* Famous work on geography written in the first century of the Christian era.

—See also 80.

17. **Mauro**, Fiorentino. (1494-1556.) *Sphera volgare novamente tradotta* (from the Latin of J. de Sacro Bosco), con molte notande additioni di geometria, cosmographia, arte navigatoria, et stereometria, proportioni et quantita dell'i elementi, distanze, grandezze, et movimenti di tutti li corpi celesti. 56 l. ill. 4to. Venetia, B. Zanetti. *Venice, 1537*

This treatise was published six years before the death of Copernicus. The earth is represented in one of the chapters p. 12 as the center of the universe round which revolve the sun and planets. The mariner's compass is represented on the title-page which also contains a globe with the name *Ametrica* written for *America*. Page 57 has another globe with the name properly written. A meridian line with compass occurs on p. 61 and again on p. 84; see also p. 95.

—See also 2.



9. GLANVILLA. (Reduced.)

CATALOGUE OF WHEELER GIFT

18.\* **Strabo.** (66-28 B. C.) *Geographicorum libri xvii. — — — item, epitomae eorundem decem & septem de geographia librorum.* 44 l.+549 pp.+12 l. Folio. Basileae, apud Joan Vualder. *Basle, 1539*  
The world as known to the ancients; celebrated work of the eminent Greek geographer.

19. **Lully, Raymond.** (Raymundus, Lullius.) (1235?-1315.) *De secretis naturae siue quinta essentia libri duo.* Accesserunt Albertus Magnus, *De mineralibus et rebus metallicis libri quinque.* 4+183+4 l. ill. 12mo. Argentorati, apud Balthasarum Beck. *Strasburg, 1541*  
This volume contains a work of Lully, the Enlightened Doctor, on medical subjects and of Albertus Magnus on minerals. Properties of rubbed lycurius, l. 106; the lodestone, l. 107; the flesh magnet, l. 107; other magnetic myths, l. 107. Lully was the author of more than 400 works.  
—See also 3.

20. **Hartmann, Georg.** (1489-1564.) *Nine Astronomical charts.* sq. 4to. *Nuremberg, 1542*  
The charts are not accompanied by text. Hartmann, vicar of the church of St. Sebaldus, Nuremberg, wrote a letter to Count Albert of Prussia, dated March 4, 1544, in which he clearly recognizes magnetic inclination, or dip. The letter remained unpublished for nearly 300 years and could not have been known to Robert Norman when he discovered the dip of the magnetic needle in 1576 and which he records in his *Neue Attractive*, 1581. See No. 66 (Ed. 1592). Hartmann was in Rome in 1510, where he found the *declination* to be 6° E. This is probably the earliest determination of magnetic declination *on land*; its discovery *on sea* is due to Columbus (Sept. 13, 1492), to whom we also owe the discovery of its variation with change of place. According to Hellmann's *Rara Magnifica*, the first *printed record* of magnetic declination is that of Francisco Falero in his *Tratado del Esphera*, an exceedingly rare book published in 1535. See also Bauer's "United States Magnetic Declination Tables and Isogonic Charts," 1902.

21. **Ulstadius, P(hilippus).** (Flour. 16th cent.) *Coelum philosophorum seu secreta naturae.* 8 l.+95 l. ill. 12mo. Parisiis, apud Viuntium Gaultherot. *Paris, 1544*  
Collection of medical prescriptions. First-edition, Freiburg, 1525.

22. **Apianus, (Bienewitz) Petrus.** (1495-1552). *Cosmographia — — 3+66 l. ill. & charta cosmographica opera Aeg. Diesthemij.* Antwerpiae, 4to. *Antwerp, 1545*  
This treatise on cosmography enjoyed a high reputation in the 16th century; the first edition appeared in 1524. The word compass, *compassus*, occurs on fol. 10 and again on fol. 20. The illustration on fol. 10 shows a compass, one pole of which is connected by a dotted line with the pole-star. Fol. 30 contains a chapter on America in which Americus Vespuus is mentioned but Columbus is ignored. There are several interesting sectional (movable) figures.

23. **Pontano, Giovanni Giovano.** (1426-1503.) *Liber de meteoris cum interpretatione Viti Amerbachii.* 10 l.+225 pp.+3 l. 12mo. Argentorati, apud Cratonem Mylium. *Strasburg, 1545*  
Collection of 49 poems on natural phenomena, such as hail, rainbows, comets, winds, earthquakes, effects of thunder. Hallam considers Pontano one of the finest Latin poets of the fifteenth century.



17. MAURO. (Reduced.)

CATALOGUE OF WHEELER GIFT

24. **Blondus, Michael Angelus.** (1497-1560.) *De ventis et navigatione - - - cum accuratissima descriptione distantiae.* 18 l. ill. 4to. Venetijs, Montisferrati. *Venice, 1546*  
The writer gives on fol. 14, ch. xxiii., a careful description of the compass including theory and rules for use. The compass is called on fol. 15 pixis or buxolus, *cf.*, the French *boussole*. Very rare.

25. **Alexander Aphrodisiensis.** (End of 2d century.) *Quaestiones locorum interni maris, & oceanii, a Gadibus ad novum orbem naturales; de anima, morales; sive difficilium dubitationum & solutionum libri iiiii.* 8 l.+297 pp.+3 l. 12mo. Basileae, per Joannem Oporinum. *Basle, 1548*  
This ancient work contains a chapter purporting to show why a magnet attracts iron.

26. **Aristoteles.** (384-322 B. C.) *Commentarii in physicam Aristotelis.* 7+293+27 l. 12mo. (Title page lacking.) *1548*  
Reference, p. 187, to "electrum vel succinum" (amber).  
—See also 31.

27. **Affaitato, Fortunio.** (?-1550.) *Phisicae ac astronomiae considerationes.* 36 l. 12mo. Venetius, apud Nicolaum de Bascarinis. *Venice, 1549*  
Fancied reference to *magnetic dip*, fol. 10; clear statement of declination, fol. 11; magnetic attraction discussed, fols. 20-25. This is a copy of the first edition, which is extremely rare.

28. **Aurifaber, André.** (1512-1559.) *Succini historia.* MS. translation of chapter VIII. 2 l. Folio. *Konigsberg, 1551*  
A few quaint remarks on amber and the lodestone.

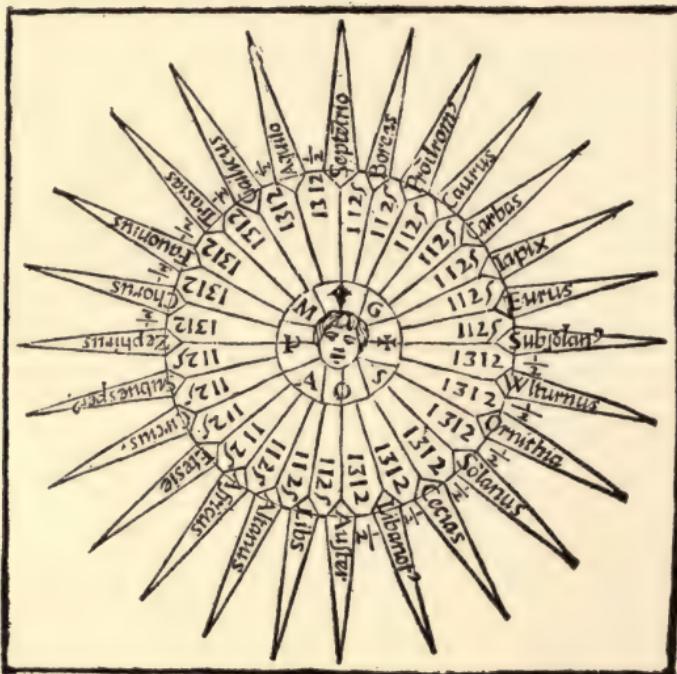
29. **Cortes, Martin.** (?-1582.) *Breve compendio de la sphera y de la arte de nauegar con nuevos instrumentos y reglas exemplificado con muy subtiles demonstrationes.* 95+3 l. ill. pl. 8vo. Sevilla, Anton Alvarez. *Seville, 1551*  
A salient feature of this early work on navigation is a chapter beginning on fol. 72 in which the magnetic declination is discussed; fol. 61 shows a circular diagram with radiating lines, 32 in number, corresponding to the points of the compass; fol. 69 has a chapter on the properties of the lodestone and the manner of making ships' compasses.

30. **Encelius, Christoph (Entzelt)** (?-1583.) *De re metallica, hoc est, de origine, varietate, et natura corporum, metallicorum, lapidum, etc.* libri iii. 8 l.+271 pp. ill. 12mo. Franc(ofurti), apud Chr. Egenolphum. *Frankfort, 1551*  
Work on metallurgy; reference to the magnet, p. 173; to jet, 181; and to amber, 194.

31. **Aristoteles.** (384-322 B. C.) *De anima libri tres.* Joanne Argyropylo Byzantio interprete. 93 pp.+1 l. 12mo. Lugduni, apud T. Paganum. *Lyons, 1554*  
Latin translation by Argyropylus; reference to the lodestone, lib. i, p. 11.

32.— *De coelo libri quatuor.* Joanne Argyropylo Byzantio interprete. 115 pp. 12mo. Lugduni, apud T. Paganum. *Lyons, 1554*  
Argyropylus, the accomplished translator of this work on motion, the earth and elementary bodies, died in Italy about 1490.

transfere tates, tuto nauigabunt obseruantes instrumentum hoc nostræ descriptionis, V tru que enim polum poterunt seruare ad dimidium oceanii, ad zonum orbem descendentes, polum arcticum, ascenderentes uero ad nos, Antarcticum, cum suis spiritibus scriptis secundum ueram distantiam, quoniam si protensum esset mare uel planum & terra sphaerica ut ait Manilius uel Cilindrica non esset, unius poli obseruatio non sufficeret, sed quoniam haec sphaerica sunt uel cylindrica ideo utroque polo eagent nauigantes & obseruatione stellarum, cum autem immensa distantia sit maris nec terra semper conspicitur uel discernitur, currauimus, diligenter uobis exponere ut specificos uentos comprehenderetis, quibus uersus quamque regionem tutius nauigareris, Nam cognitis spiritibus uela tendentibus noscitur a prudentibus quo nam ueliuolant, propterea hortamur uos omnes nauigantes ut non nobis sed altissimo tantum referatis gratias, in huius noui pixidis descriptione, quo duce nauigabitis tutius quam hactenus fecistis, seruauit n. Deus hoc usq; ad h.e.c tempora, quo indies eius memores existatis, diligentes ipsum, quia & ille uos plurimum dilexit.



PI X I S uel Buxolus instrumentum & dux nauigantium.

24. BLONDUS. (Reduced.)

CATALOGUE OF WHEELER GIFT

33.— De generatione et corruptione libri duo, Francisco Vatablo interprete. 67 pp. 12mo. Lugduni, apud T. Paganum.

Lyons, 1554

Properties of elementary bodies; the translator was François Vatable, a French priest, who died in 1547.

34.— Meteorologicorum libri quatuor, Francisco Vatablo interprete.

136 pp. ill. 12mo. Lugduni, apud T. Paganum. Lyons, 1554  
Treatise on general meteorological phenomena; translated by Vatable.

35.— Physicorum Aristotelis, seu de naturali auscultatione, libri octo.

Joanne Argyropolo Byzantio & Francisco Vatablo interpretibus. 215 pp. 12mo. Lugduni, apud G. Rovillium.

Lyons, 1554

Treatise on physics. Bound in are two sheets of illuminated MS.

36.— De sensu et sensili, memoria et reminiscencia, somno et vigilia, insomniis, divinatione in somno, longitudine et brevitate vitae, iuventute, et senectute, et vita et morte, et respiratione, Francisco Vatablo interprete. 111 pp. 12mo.

Lugduni, apud T. Paganum. Lyons, 1554

Tracts on the senses, memory, sleep, old age and death, translated by Vatable.

—See also 26.

37.\* **Cardano, (Girolamo).** (1501-1576.) De subtilitate, libri xxi. 12 l.+561 pp. ill. portr. Folio. Basileae, apud Ludovicum Lucium.

Basle, 1554

Famous work of the celebrated Italian physician, mathematician and writer on physical science. Gagates, 157; amber, 158; difference between electric and magnetic attraction, 158; different classes of magnets, 213. First edition, 1550.

37a.— Another edition. 718 pp.+29 l. ill. sm. 8vo. Lugduni, apud Gulielmum Rovillium.

Lyons, 1559

Cardan is known to mathematical readers by his method of solving cubic equations. In this treatise on the *Subtilty of Things*, the author gives his views on the lodestone in book viii. On p. 278 he refers to magnetic declination, saying that the pole-star is *five parts* to the east of the pole of the world.

37b.— Les livres de H. Cardanus intitulés de la subtilité, etc., subtiles inventions ensemble les causes occultes et raisons d'icelles. Traduit du Latin en François par R. le Blanc. 4 l. +391 l.+26 l. ill. 4to. Paris, Foucher.

Paris 1556

Translation by Richard Le Blanc. On fol. 147 it is stated on the authority of Albertus Magnus that Aristotle was acquainted with the *boeste nautique*, the mariner's compass. The hyacinth (stone) is said, fol. 132, to afford complete protection against lightning. The phenomena of thunder and lightning described on fol. 387, 388.

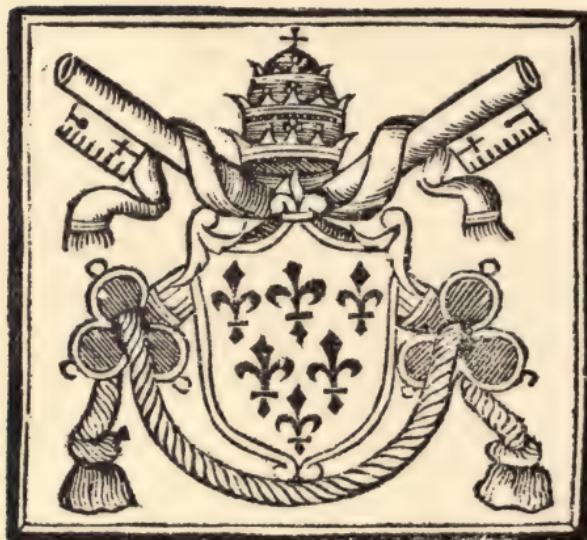
—See also 45, 79.

38. **Belon, Pierre.** (1517-1564.) Les observations de plusieurs singularitez et choses memorables, trouvées en Grèce, Asie, Judée, Egypte, Arabie & autres pays estranges, &c. 4 l.-275+33 l. ill. 12mo. (Title page missing.) Anvers, chez Chr. Plantin.

Antwerp, 1555

Fol. 162 contains remarks on the use of the lodestone for navigating purposes; on fol. 238 the statement is made that when yellow amber is rubbed,

AD P A V L V M . I I I :  
P O N T I F I C E M F O R T U N A T I S S I  
mum Optimum Maximumq; Fortunij Affaytati  
Phisici, atq; Theologi, Phisice ac Astro-  
nomicae cōsiderationes. Quarum  
Catalogus uersa pagins  
conspicitur.



V E N E T I I S M D X L I X

C U M P R I V I L E G I O .

27. AFFAITATO.

CATALOGUE OF WHEELER GIFT

it attracts iron as the lodestone does, fol. 317; also the usual reference to the suspension of Mahomet's coffin.

39.\* **Fracastoro**, (Girolamo). (1483-1553.) *Opera omnia, in unum proxime post illius mortem collecta - - - accesserunt Andreae Naugerii patricii Veneti, orationes duae carminaq nonnulla.* 6+285 pp., portr. 4to. Venetiis, apud Juntas.

*Venice, 1555*

Astronomical, metaphysical and especially medical subjects. References to magnetic and electric attraction; attractive property of rubbed diamond. The author was poet, physician and philosopher; the volume includes his extraordinary poem *de morbo gallico*.

40. **Marbodeus**. (1035-1123.) *Dactylotheca. - - - nunc altera vice, supra priorem aeditionem illustrata. Item de lapide molari et de Cote carmen panegyricum, eodem autore Georgio Pictorio.* 8 l.+80 pp. 12mo. Basileae, per Henrichum Petri.

*Basle, 1555*

Poem on jet (gagates), p. 40; on the magnet, p. 55; rare.

—See also 12.

41. **Medina**, Pedro da, (about 1493—?) *L'arte del navegar, in la qual si contengono le regole, dechiarationi, secreti & ausi, alla bona nauegation necessarij - - - tradotta de lingua Spagnola in volgar Italiano - - - (da Vicenzo Paletino da Corzula.)* 12+cxxxvii+2 l. ill. diagrams and full page map of the new world. Venitia, G. Pedrezano. *Venice, 1555*  
The sixth book treats of the mariner's compass, here called "Bossolo da Navigar"; map of America on fol. xxiii; elaborate compass-card, fol. cviii. The author denies the *variation* of the compass. Medina was special examiner of Spanish pilots, and the map here included is highly valuable. The first section is dated 1545.

42.\* **Naugerius**, Andrea. (1483-1529.) *Orationes duae habitae; una in funere Bartholomaei Liviani, altera in funere Leonardi Lavretani Venetiarum principis, carminaq, nonnulla.* 32 pp. 4to. Venetiis, apud Haeredes Lucaeantonii Juntae.

*Venice, 1555*

Two funeral orations.

43.\*—**Lusus**. Venetiis, apud Haeredes Lucaeantonii Juntae.

*Venice, 1555*

A metrical composition on *Sport*. The above two works are bound with No. 39.

44. **Agricola**, (Landmann) Georg. (1494-1555.) *De re metallica libri xii.* 5 l.+538 pp.+36 l. Folio. Basileae, Froben.

*Basle, 1556*

First great work on metallurgy, remarkable for its numerous and quaint illustrations. Slight references to amber and the lodestone pp. 27, 194, 471.

45. **Cardano**, Girolamo. (1501-1576.) *De rerum varietate libri xvii.* 16 l. +1194 pp.+32 l. portr. 8vo. Basileae, H. Petri.

*Basle, 1557*

Describes, p. 656, a method of obtaining the continuous motion of an iron pointer over a circular lodestone; cf., *Peregrinus*, ch. ii.; he states, p. 1059, that some magnets attract silver. Portrait of Cardano, aged 49, on title page.

—See also 37.

¶ breve compendio de la sphera y de la arte de nauigar con nuevos instrumentos y reglas exemplificado con muy subtileas demonstraciones: compuesto por Martin Cortes natural de burjalaroz en el reyno de Dragon y de presente vezino de la ciudad de Cadiz: dirigido al invictissimo Monarca Carlo Quinto Rey de las Espanas etc. Señor Nuestro.



29. CORTES. (Reduced.)

CATALOGUE OF WHEELER GIFT

46. **Petrus Peregrinus.** (Flour. 13th cent.) *De Magnete, seu rota perpetui motus, libellus. Divi Ferdinandi Rhomanorum Imperatoris auspicio, per Achillem P: Gassero, L: nunc primum promulgatus.* 28 l., 4 engravings. Sm. 4to. Augsburg in Suevia. Augsburg, 1558

This, the earliest work on the magnet, was written in the form of a letter by Pierre de Maricourt (Petrus Peregrinus) to a friend of his in Picardy. It was dated from the French camp before Lucera (Italy), August 8, 1269. The thirteen chapters into which the letter is divided form the most original, extensive and important treatise on the magnet prior to Gilbert's *De Magnete*, (No. 72). Gilbert was well acquainted with the letter of Peregrinus. This is a copy of the first printed edition, of which only eighteen are known. It includes a list of books that deal with the subject of the magnet. A reprint based on Bertelli's version appears in Hellmann's *Rara Magnetica*, Berlin, 1898. In 1900, Quaritch of London printed a fac-simile in colors (50 copies) of a MS. written about A. D. 1390, and owned by Prof. S. P. Thompson. The *Epistola* was plagiarized by Taisnier (See No. 53), a translation of whose book into English was made by Richard Eden, and printed in 1579.

46a.†—Photographic reproduction of MS. in Bodleian Library, Oxford. (MS. Bodl., No. 7027.) 13 leaves.

This is a fine fourteenth century MS. folio, of 13 leaves, 9x11 inches written in Gothic letters in two columns of thirty-five lines each. It is rubricated in red and blue throughout. There are two finely drawn diagrams, corresponding to Figs. 2 and 3 of Gasser's edition. The Manuscript does not say when or where written.

46b.†—Prospectus of an edition of 300 numbered copies (150 for America) of the earliest work of experimental science: The Epistle of Pierre Pelerin de Maricourt, to Sygur de Foucaucourt, soldier, on the lodestone. Charles S. Peirce. 16 pp. Sm. 4to. (New York, 1892)

Announcement of the proposed publication of a translation by the author, of the *Epistle* from the Paris MS. (Codex P, collection 7378 A; see Libri, No. 939). Two pages of the Latin text are printed line for line in special type made in Paris, and accompanied by translation and notes. Several pages are devoted to quotations (in Latin and in English) from Roger Bacon relating to Peregrinus. The publication of the work was abandoned.

46c.†—Epistle of Petrus Peregrinus of Maricourt, to Sygerus of Foucaucourt, soldier, concerning the magnet. Silvanus P(hillips) Thompson. 16 l. Sm. 4to. London, 1902

A translation into English based upon Gasser (1558), Bertelli (1868) and Hellmann (1898), amended by reference to a MS. of A.D. 1390 owned by the translator. The initials are supplied by hand, and the copies (50) are rubricated throughout. Privately printed in Caxton type, at Chiswick press.

46d.†—The letter of Petrus Peregrinus on The Magnet, A. D. 1269. Translated by Brother Arnold, M. Sc. With introductory note by Brother Potamian, D. Sc. 19+42 pp., illus. 4to.

New York, 1904

The introduction to this handsome edition traces the history of the lodestone down to the time of Peregrinus. An appendix of five pages gives interesting notes on early references to the mariner's compass.

dulce, & optimè olens, adeò ut suscitum in conclaibus contra pestem c  
(iuuat enim) ad tertiam usq; diem conclaue olere bene faciat. Omne enim bene olens dum suffit, uapores absumēdo corruptos, aerem ab omni uitio liberat: liberant ergo magis, quæ magis fragrant, & quæ tardius consumunt: quæ uero calida & siccata sunt, uapores celerius absument. Ob id magnus ignis præstantissimum est auxilium aduersus pestilentem aeris statum, ut etiam flabella: uariant enim aerem uapores, tum naturali loci ex quo eleuant, tum quia Solis radios penetrare prohibent. Ob id referunt in Germania uallem Ioachimicam cum ob sylas densas & stagna inhabitabilis esset, deriuatis aquis in cuniculos ac fossas, succisq; nemoribus, salubrem factam esse. Itaque nil mirum est, duplice auxilio flagrans succinum aerem emendare, tum quia siccum, tum

*Hippocrates et Aeron medici Athenæ à peste liberant.*

aut quia bene olens. Ita uidentur bis olim Athenæ ignis beneficio à duob. medicis Hippocrate & Acrone peste liberatae, flammis scilicet bene o- lentium lignorum, non quidem mediocribus, sed maximis. A mediocribus enim ignibus, & minimè odorata materia succensis, tantum abest ut pestilens aer emendetur, tum magis si beneficium uentorū abest, ut etiam uehemeter exacerbetur. Quamobrem Thucydides refert, cum ob multitudinem cadavera rogis imponerent, non parum auctam pestilentia. Manifestum est igitur, eisdem penè causis succinum eidem morbo medicamentis immixtum, plurimum conserre. Miseretur enim aut propter odorem, aut siccandi causa, aut, quod euidentius est auxiliū in eo, attrahendi: trahit enim omnia leuia, paleas, festucas, ramenta tenuia metallorū, & ozimi folia, perperam cōtradicente Theophrasto. Causa est huius, quod humidū habeat pingue & glutinosum, quo emisso res siccā combibere cupiēs, uersus fontem, id est, succinū ipsum mouetur. Omne enim siccum postquam humidū combibere cooperit, ad ipsum etiam fertur, ut etiam ignis ad pabulum: unde si fricetur uehementius, etiam trahit ob calorem. Nec enim lapidis Magnetis & succini cadē trahendi ratio: nam succinū omne leue trahit, Magnes ferrum solū. Succinū interposito corpore non mouet plaeam, Magnes ferrum. Succinū non trahitur uicissim à palea, Magnes trahitur à ferro etiam. Palea à succino in nullam partem dirigitur, ferrum modò ad Boream, modò ad Austrum contactu Magnetis tendit. Deniq; succini attractio calido & frictione iuuatur multū, Magnetis eo solū quod purior pars lapidis redditur. Quid tandem succini attractio haud dubie est similis illi, quæ à cucurbitula ab igne & ceteris calidis, ob pingue illud calidum innatum, quod etiam adhaerens parietibus, ut dixi, conlauiā etiam in tertium diem bene olere facit. Est enim in omni bitumine humidū pingue calidum, ob quod etiam facile ardet. Sed in trahendo inter bitumina succinum, inter succini genera cinereū, quod citra ostium Viſtulæ ad Pucecam in littore maris effoditur: hoc enim, ut Agricola refert, dum ferro attereret, folia ex humo ad duos pedes in sublimē ad

*Cur succinum paleas trahat.*

CATALOGUE OF WHEELER GIFT

46e.†—Petrus Peregrinus—Author of the earliest treatise on the magnet, A. D. 1269. By Brother Potamian. (Extract, Electrical World and Engineer, Vol. 43, pp. 514-515, March 12, 1904.) 8 pp. 8vo. *New York, 1904*

46f.†—Petrus Peregrinus de Maricourt and his *Epistola de Magnete*. By Silvanus P(hillips) Thompson, D. Sc., F.R.S. (Extract, Proceedings of the British Academy, Vol. II, 1906.) 32 pp.; fac-simile of page of MS. 8vo. *London, 1906*

The paper contains an account of 28 MSS. and of 11 printed versions (in whole or in part) of the *Epistola* and the location of the 18 copies known to exist of the 1558 (Gasser) edition.

46g.†—Petrus Peregrinus, the earliest of magicians. By Brother Potamian. (Electrical World, Vol. 49, pp. 504-505, March 23, 1907.) Ill. Folio. *New York, 1907*

General account of the life and magnetic work of Petrus Peregrinus, Pierre de Maricourt.

—See also 463, 540a.

47. **Porta, Giovanni Battista della.** (1538-1615.) *Magiae naturalis sive de miraculis rerum naturalium libri ivi.* 8 l.+163 pp. Folio. Neapoli, apud Matthiam Cancer. *Naples, 1558*

This famous work on "Natural Magic" was published when the author was only sixteen. He extended the matter in subsequent editions, particularly in that of 1589. (See No. 64.) Pp. 88-90, sympathetic telegraph.

47a.—Another edition. 8+135 pp.+1 l. 12mo. Antverpiae, ex officina Christophori Plantini. *Antwerp, 1560*

Book treating of natural wonders. Reference to magnets, p. 74; on p. 75 we read: "quod magnes ferrum, arenam, oleum, et omne traheret."

47b.—Another edition. 9 l.+135 pp. portr. 12mo. Antverpiae, ex officina Christophori Plantini. *Antwerp, 1561*

Pages 74 and 75 treat of the effects of the lodestone, some of which are fanciful; its uses in navigation are stated as also why the magnet points to the north; the author records the magnetic experiment related by St. Augustine in his *De Civitate Dei* and refers to the statue containing iron "in capite" said to be suspended in mid-air in the temple of Serapis. (See No. 10.)

—See also 64, 67.

48. **Pedemontani, Alexius.** (— — .) *De secretis libri sex, mira quadam rerum varietate referti ex Italico in latinum sermonem nunc primum translati per Joannem Jacobum Weckerum.* 8 l.+279 pp.+12 l. Sm. 8vo. Basileae. *Basle, 1559*

Chiefly a collection of medical prescriptions.

49. **Taisnier Jean.** (1509-1602.) *De usu sphaerae materialis, hactenus ab omnibus philosophis & mathematicis magno studiosorum incommodo neglecto nunc vero in lucem tradito.* 4 l.+46 pp. Sm. 4to. Coloniae, excudebat Joannes Bathenius. *Cologne, 1559*

Work on astronomy by the Belgian mathematician, famous in its time.

LIVRE II. DES SINGVLA.  
CHAP. XVI.

Que les mariniers nauigeoyent anciennement  
sans l'aiguille & quadran. & sans auoir  
vsage de la pierre d'Aimant.

**P**ierre d'aimant      **L**apis herculeus.      **M**agnes.      **S**ideritis.      **C**alamita.  
 *E*s anciens auoyent plus grande difficulté en leurs nauigations que nous n'auons maintenant : car lors n'en paix, n'en guerre ils n'auoyent adresses, sinon de la conjecture de l'Orient, Soleil couchant, Septentrion, & Midy : ou des estoilles & Soleil qu'ils veoient de jour & de nuit, & le plus souuent ne perdoyent point la terre de veue. Mais maintenant que tout le monde à cogneu la vertu de la pierre de l'Aimant, la nauigation est si facile, que deux hommes osent s'aventurer à tous propos avec vne petite barque, à tous heurts, aux plus impétueux vents, & trauerser la mer: ce que les anciens n'euissent osé faire n'y entreprendre en plain jour, lors qu'ils n'auoyent l'aiguille & quadran frottée avec la pierre d'Aimant. Ceste est la pierre autrement nommée Lapis Herculeus, ou Magnes, & Sideritis, & en Italien Calamita : en laquelle lon trouue vertus cōtraires: car l'vn des bouts fait que l'aiguille regarde en tout temps la partie de Septentrion, & l'autre bout le Midy. Nous trouuons que ccluy qui inuenta premierement l'usage de ladite pierre, auoit nom Flauius. Mais le premier qui ait escrit de telle vertu, cest Albert le Grand: lequel ayant

CATALOGUE OF WHEELER GIFT

50.--- De annuli sphaerici fabrica & usu, libri tres geometrici, omnibus mathematics. - - - 27 pp.+3 l. ill. 4to. Antverpiae, in edibus Joannis Richardi. *Antwerp, 1560*  
 Treatise on globes and problems on general astronomy.  
 —See also 53.

51.\* **Carpentarius, J(acobus).** (— —) Descriptio universae naturae. 2 vols. in 1. 4to. Parisiis, ex officina G. Buon. *Paris, 1562-1566*  
 Metaphysical treatise followed by a brief description of the animal and vegetable kingdoms.

52. **Ptolemaeus, Claudius.** (2d century.) Geographia. Olim a Bilibaldo Pirckheimherio translata, at nunc multis codicibus graecis collata et redacta a Jos. Moletio. 4 l.+286+64 pp.+32 l. 64 maps. 4to. Venetiis, apud Vincentium Valgrisium. *Venice, 1562*  
 To the great work of the Alexandrian astronomer and geographer, have been added eight maps of America besides others of northern Europe.

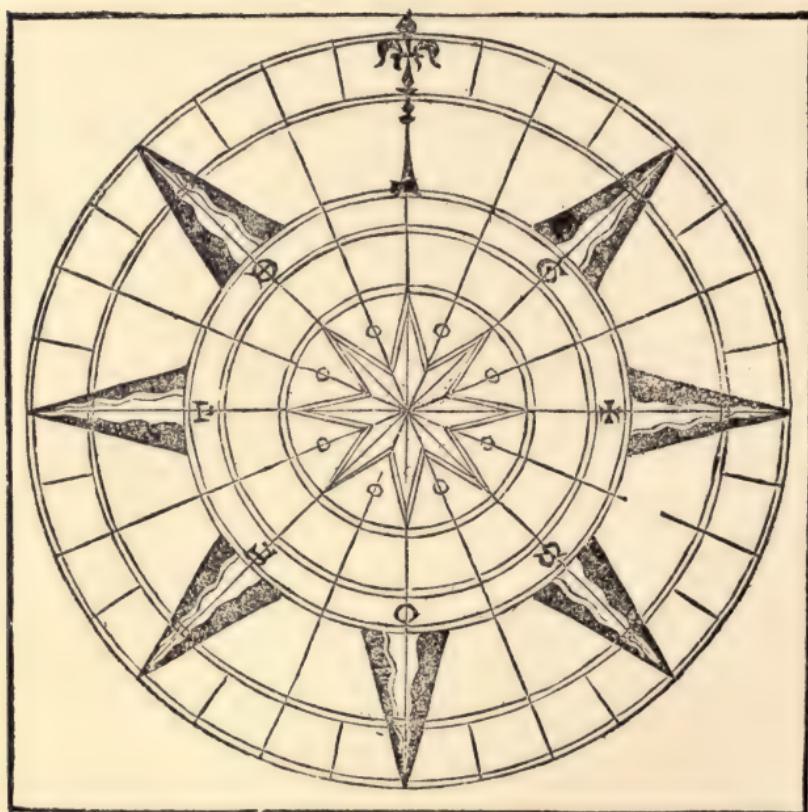
53. **Taisnier, Jean.** (1509-1562.) Opusculum perpetua memoria dignissimum de natura magnetis, et ejus effectibus. 2 l.+84 pp.+1 l. ill. 2 portr. Sm. 4to. Coloniae, apud Joannem Birckmannum. *Cologne, 1562*  
 The first 15 pages of this rare work refer to the lodestone, its properties and uses, taken without acknowledgment from the *De Magnete* of Peregrinus. Figures of floating lodestones; the usual form of the compass needle. (See No. 46.)  
 —See also 49.

54. **Dolce, Lodovico.** (Also Dulci.) (1508-1566 (?) 1569.) Libri tre; nei quali si tratta delle diverse sorti delle gemme che produce la natura. 99 l. 12mo. Venetia, Gio. Battista. *Venice, 1565*  
 Work on precious stones; plagiarism from Camillus Leonardus; (see No. 5.)

55. **Claudianus, Claudius.** (4th Century.) Opera, Theodori Pulmanni diligentia, et fide summa, e vetustis codicibus restituta. Accedunt ad Claudiani opera Martini Antonii Del-rio notae. 353 pp.+3 l.+80 pp.+2 l.+29 pp.+1 l. 12mo. Antverpiae, ex officina Chr. Plantini. *Antwerp, 1571*  
 Contains a celebrated poem of 57 lines on the lodestone, beginning p. 322. The lodestone is not found among the ornaments of kings or women, but is eagerly sought for by those acquainted with its power; the statue of Mars contains iron, that of Venus the magnet. This idyll, it is said, suggested to the Italian Jesuit, Famianus Strada, his famous poem on the magnet published in his *Prolusiones Academicae*, 1617. (See No. 90.)  
 —See also 72a.

56.\* **Titelman, F(rancis.).** (16th Century.) Naturalis philosophiae compendium, sive De consideratione rerum naturalium libri xii. 248 pp.+12 l. 12mo. Venetiis, apud Joann. Antonium Farreum. *Venice, 1571*  
 Principles of metaphysics; reference to magnetic attraction, p. 136.

CVIII  
LIBRO SESTO  
DELLA AGVGGIA, OVER  
BOSSOLO DA  
NAVIGAR.



41. MEDINA. (Reduced.)

CATALOGUE OF WHEELER GIFT

57. **Avianus**, (Flavius). (Flourished about 150 A.D.) *Aviani Aesopicarum fabularum liber, a Theod. Pulmanno ex membranis in lucem editus.* 29 pp.+1 l. 16mo. Antverpiae, ex officina Christofori Plantini. *Antwerp, 1572*  
Latin poet who wrote in elegiac verse a number of fables after the manner of Aesop.

58. **Biringuccio, Vanucci**. (End of the 15th—middle of the 16th Century.) *La pyrotechnie; ou, Art de feu, contenant dix livres. Traduite d'Italien en François par Jacques Vincent.* 4 l.+168 pp. ill. 4to. Paris, Claude Fremy. *Paris, 1572*  
On page 56 of this book on Pyrotechny will be found an account of numerous extraordinary properties attributed to the lodestone in some of which the author expresses his belief. The original edition appeared in Venice, 1540.

59. **Lemnius, Levinus**. (1505-1568.) *Occulta naturae miracula, ac varia rerum documenta, probabili ratione atque artifici conjectura explicata.* 8 l.+473 pp.+11 l. 12mo. Gandavi, ex officina G. Manilij. *Ghent, 1572*  
Wine spoilt by lightning and thunder, p. 272. The compass is called, p. 304, *pixidecula nautica, vulgo Compas.* First edition, Antwerp, 1559.

60. **Maurolycus, Franciscus**. (1494-1575.) *Opuscula mathematica.* 11 l.+285 pp. ill. 4to. Venetiis, apud Fr. Francisicum Senensem. *Venice, 1575*  
Work of merit on astronomy and geometry by a Sicilian Abbot. The orientation of the magnet is referred to p. 100, *et seq.* The writer argues that the needle does not point due north but to a magnetic island mentioned by the Swedish prelate and historian, Olaus Magnus.

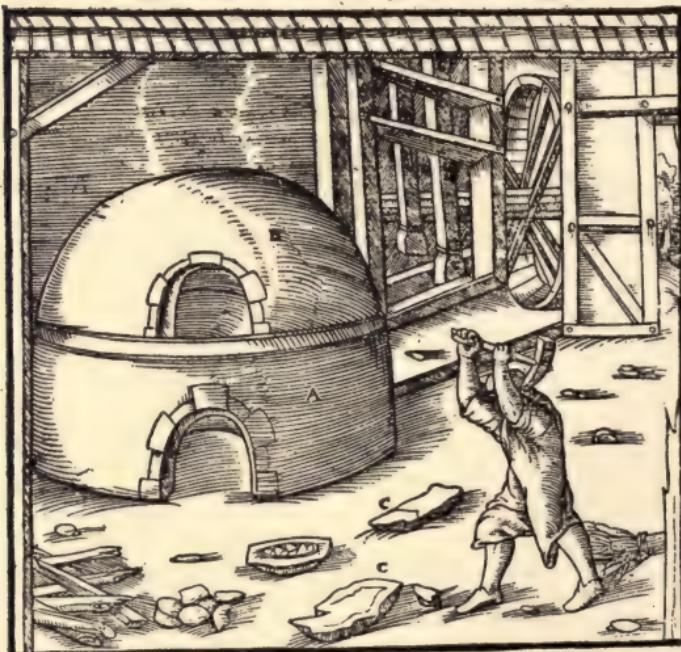
61.† **Besson, Jacques**. (1540-?) *Theatrum instrumentorum et machinarum Jacobi Bessoni Delphinatis mathematici ingeniosissimi cum Franc. Beroaldi figurarum declaratione demonstratum.* (text in French.) 20 l. 60 plates (plates 49-56 missing.) Folio. Lugduni, apud Barth. Vincentium *Lyons, 1578*  
Full-page illustrations of various mechanical devices. Besson was a French mathematician and inventor.

62. **Camorano, Rodrigo**. (— — —.) *Compendio de la arte de navegar.* 4 l.+60 pp. 1 plate, 1 portr. 4to. Sevilla, A. Pescioni. *Seville, 1582*  
Compass-card with 32 radial lines, p. 9; rotation of the pole-star round the axis of the world, p. 29; chapter on the compass, p. 34, with diagram showing the use of two rectangular axes for suspension.

63. **Rao di Alessano, Cesare**. (16th Century.) *I meteori. I quali contengono quanto intorno a tal materia si puo desiderare.* 16+167 l. 4to. Venetia, Gio. Varisco. *Venice, 1582*  
L. 131, causes of lightning and thunder; different kinds of thunder, color of lightning-flashes also why lightning precedes thunder, and whether it always does so. L. 134, places and seas in which lightning is most frequently seen. L. 135 contains an account of the effects of lightning together with protection against the same. Aristotle is frequently quoted.

ſa facti unā cōmiftcantur: ad quas adiūciatur minuta magnetis particula: certe singularis illa uis nostris cuiū tēporib. & que ac priscis ita in ſe liquorē uitri trahere creditur, ut ad ſe ferrū allicit: tractū aut purgat, & ex uiridi uel luteo candidū facit: ſed magnetē poſtea ignis cōſumit: qui uero iā dictis ſuccis carēt, ipli duas portiōes cineris querunt uel illicnei, uel roborei, uel cerrei, aut, ſi hi in pōptu non fuerint, faginī uel abiegnī cū una fabuli uel arenae permifcēt, & addūt modicū ſalē, ex aqua ſalſa uel marina factū, atq; exiguā magnētis particula: ſed iſti minus candidū & translucidū uitru cōſiciunt: uerū cinis ex antiquis arborib. fit: quarū trunca, ubi aſſurrexit ad altitudinē ſex pedū cauatur, & iniecto igni arbor tota cōburitur, ac in cinerem uertitur: quod fit hyeme cū niues diutinæ ſedent, uel aestate, cū non pluit: nā imbræ alijs annis tēporib. qd cineres cū terra miſceāt, impuros reddūt: quā obrē tūc ex hſdem arborib. in plures partes ſectis, & ſub teſto cōbūſtis, cinis cōſiat. Sed uitra iſiſ alijs tres ſunt fornaces, alijs duæ, alijs una: quib. tres, hi in prima coquūt materiā, in ſecūda eā recoquūt, in tertia refrigerant uitrea uafā & cætera ope ra cādentiā: eorū prima fornax cōcamerata & furno ſimilis ſit: in cuius ſuperiori camera, longa pedes ſex, lata quatuor, alta duos lignis aridis accēſis reſiſtātē coquātūt acri igni donec liqueſcant, & in maſſam uertatur uitrea: etiā nondum ſatis à recremento purgatam: ea refrigerata extraſahatur & in partēs diuidatur: in eadem fornace ollæ, quæ continebunt uitrum, caleſiant.

Prīma fornaciſ inferior camera A. Superior B. Vitrea maſſa C.



44. AGRICOLA. (Reduced.)

CATALOGUE OF WHEELER GIFT

64. **Porta, Johannes Baptista della.** (1538-1615.) *Magiae naturalis sive de miraculis rerum naturalium libri xx.* 9 l.+303 pp. ill. portr. Folio. Neapoli, apud Horatium Saluianum.

*Naples, 1589*

Book vii. of this folio edition treats of magnetic phenomena. The magnetic field is clearly defined in cap. 22; the screening action of iron is recognized, cap. 30; the fact that sailors preferred steel for their compass-needles is stated, cap. 36, the reason assigned being that such magnets keep their "vim per centum annos." The weakening effect of heat is described, cap. 51. The preface to Book vii. contains on page 128 a clear statement of a sympathetic telegraph. See *Strada* (No. 90); the *Spectator* (No. 241); the *Guardian* (No. 119); *Gherardi* (No. 1799).

64a.— —Another edition. 18 l.+669 pp. ill. 12mo. **Francofurti, Samuel Hempelius.**

*Frankfort, 1607*

Book vii. of this edition treats of the lodestone and compass; p. 289 contains the author's idea of a sympathetic telegraph, which he is said to have derived from Cardinal Bembo.

64b.— —(English translation.) *Natural magic in twenty books wherein are set forth all the riches and delights of the natural sciences.* 3 l.+409 pp.+3 l. ill. Folio. London, Thomas Young.

*London, 1658*

This is the first English edition of Porta's celebrated work, being a translation from the Latin edition of 1589. Book vii. treats of the lodestone and magnetic phenomena. The famous allusion to a magnetic telegraph, p. 190; lodestone ground to powder, p. 199; magnetic attraction measured by balance method, p. 200; magnetic screening, p. 204; the declination and its variations, p. 208; place of no variation, p. 208; effect of heat on magnets, p. 212; magnetic field, p. 203; magnetic induction, p. 203; polarity produced by rubbing with lodestone, p. 206; uses of the sailing compass, p. 208. Porta owed much to Peregrinus, A. D., 1269; Gilbert, 1600, was indebted to both.

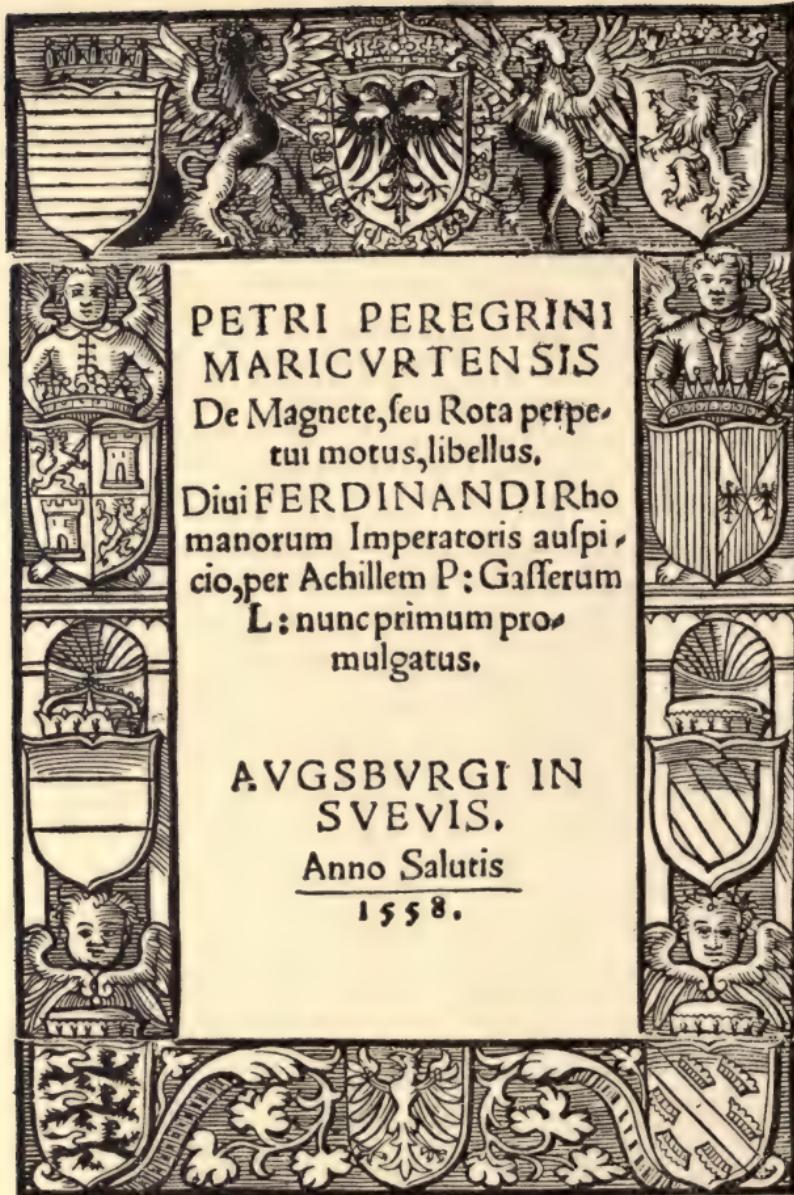
—See also 47.

65. **Borough, William.** (1536-1590.) *A discourse of the variation of the compasse, or magnetical needle. Wherein is mathematically shewed, the manner of the observation effects, and application thereof, made by W. B. (William Borough), and is to be annexed to the New Attractive of R. N. (i.e., Robert Norman).* 30 l. ill. 4to. London, by E. Alde, for Heugh Astley.

*London, 1592*

This very rare tract (preface dated 1581) derives its special importance from its being the first work in which was shown how the "Variation of the Compass" could be determined by accurate observation. The author's method is described in the third chapter, the value of the "Variation" there given, for London (1580) being  $11^{\circ} 15'$  east. This interesting tract was printed together with Norman's *Newe Attractive* in 1581, 1585, 1592 and 1614.

66. **Norman, Robert.** (Flourished 1590.) *The Newe Attractive, containing a short discourse of the magnes or loadstone: and amongst other his vertues, of a new discovered secret and subtil propertie, concerning the declining of the needle, touched therewith under the plaine of the horizon. Hereunto are annexed certaine necessary rules for the arte of naviga-*



46. PETRUS PEREGRINUS.

In quo sit a. atole d. uer-  
 in diole i. ifm i. p. t. e. d.  
 uide. ut flant. 2. lapidex  
 eo. posta lapitem q. a. tr-  
 uet. aque exponas. ut  
 flingat. viceb. q. a. b.  
 det. a. atone. ut p. 2. fric-  
 tura. n. no collit. p. p. t.  
 p. n. lapidis si sit vni-  
 genens. i. s. c. o. q. p. b.  
 lapid. in ipu fractura q.  
 sit. b. n. diol. evistat. h.  
 g. o. lapis de quo n. e. d.  
 tum est. singatur. ab.  
 de reliquo i. q. d. tenet  
 si aque exponat. viceb.  
 q. d. erit in diole ut p.  
 q. u. et ad in diole si aq.  
 exponat. p. v. o. re. l. i. q. ex-  
 p. t. e. fr. t. t. u. r. a. al. erit q.  
 sit. c. Erit g. o. u. de lapis  
 . c. d. p. m. o. lapis. al. b.  
 sit. a. g. e. n. s. c. d. p. a. i. e. n. s.  
 Si q. v. i. t. e. q. d. n. e. p. c. e.  
 diol. lapid. q. a. n. sepi-  
 cione. n. v. n. o. l. a. p. i. d. e.  
 r. i. n. t. q. t. u. n. e. p. o. s. t. sepi-  
 one. v. n. a. u. e. m. e. a. t. r. i. o. l.  
 alta in diol. q. si n. r. b.  
 hec dem p. c. e. a. p. p. x. i. n. e.  
 v. n. a. a. l. t. u. n. a. t. r. i. n. x. i. t.  
 quo  
 usq. sibi u. n. g. i. n. t. a. i. p. o.  
 b. c. v. fr. t. u. r. a. f. u. n. t. v. n.  
 q. u. t. a. e. s. t. de. n. a. t. u. r. a. l. a. p.  
 p. c. t. u. f. u. n. e. v. n. u. c. o. r. p. u. s

ut p. c. signu. est si ille  
 c. e. m. e. n. t. u. r. e. e. a. n. d. e. m.  
 o. p. u. c. o. m. q. u. p. m. o. e. x. a.  
 b. i. c. A. g. e. n. s. g. o. u. t. i. n. d. e.  
 e. x. p. u. n. t. o. i. n. t. e. n. d. i. t. s. u.  
 u. n. p. a. i. e. n. s. g. v. m. r. e.  
 h. a. f. i. c. r. o. n. e. s. i. l. l. i. t. u. d. i. m.  
 u. n. g. e. n. o. r. g. a. b. u. n. g. a. t.  
 c. u. t. u. t. e. a. t. o. n. i. s. f. a. c. y.  
 u. n. l. i. n. e. a. e. x. a. g. e. n. t. e. e. t.  
 p. a. i. e. n. t. e. s. h. u. n. c. o. r. d. i. e.  
 a. b. c. d. u. t. b. c. s. i. n. t. p. m.  
 v. n. u. i. n. h. u. c. u. v. m. d. u. e.  
 r. e. a. n. t. r. e. s. a. l. u. a. t. u. r. p.  
 t. e. m. p. c. i. t. a. s. p. a. n. e. x. t. i.  
 m. a. v. i. s. i. l. i. c. t. d. i. n. e. q. n. a.  
 e. r. a. n. t. p. m. o. a. n. a. t. h. i. l. e.  
 e. i. n. t. o. t. a. l. i. n. e. a. s. i. c. e. n. t.  
 i. n. d. u. i. s. a. e. o. d. e. m. m. o. d.  
 t. e. n. d. i. o. l. i. s. i. c. e. n. t. i. n. p.  
 p. a. i. e. n. t. e. d. u. i. s. o. s. i. c. e. i. s. t.  
 n. i. n. i. p. v. m. t. o. b. e. u. n. o.  
 e. f. f. i. l. a. t. i. d. e. t. e. d. e. m. o. d.  
 a. c. t. i. d. i. s. i. a. u. n. g. i. t. u. r.  
 t. i. d. d. y. t. e. d. u. i. n. e. f. l. a. n. t.  
 v. n. a. u. t. i. c. e. v. m. o. n. s. i. p. r.  
 a. c. t. o. m. s. s. h. u. n. c. o. r. d. m. e.  
 c. d. a. b. v. t. d. a. s. i. n. t. v. n. u.  
 p. m. t. u. n. c. e. r. e. m. a. r. e. b. i. t.  
 p. d. e. c. p. t. i. n. s. p. a. i. c. e. x. m. a. y.  
 d. i. c. h. i. n. o. a. n. q. v. m. t. e. t. v.  
 c. n. a. q. p. e. n. a. r. i. o. l. b. u. n.  
 i. n. t. i. o. n. a. l. s. i. c. p. b. a. c. r. o.  
 d. u. i. s. h. i. a. c. f. i. c. i. e. n. t. a. b.  
 n. o. s. a. l. u. a. r. e. h. p. d. e. p. t. i. n. s.

NO. 46a. PETRUS PEREGRINUS. (Page of Bodleian MS.)

CATALOGUE OF WHEELER GIFT

tion: by the same R. N. newly corrected and amended by M. W. B(orough). 48 l. ill. 4to. London, by E. Allde, for Hew Astley.

London, 1592

The fourth chapter of this remarkable and very rare work, the first in English on the magnet, contains the earliest printed record of the magnetic dip. The illustration shows its value,  $71^{\circ} 50'$ , in London for 1576, year in which the discovery was made by Norman himself. It is said that Hartmann of Nuremberg had noticed in 1544 the tendency of a magnet, freely movable in a vertical plane, to depart from the horizontal, but his letter remained unpublished for nearly three hundred years. (See Hellmann's *Rara Magnetica*, 1898.) The *Neue Attractive* contains a recognition of the sphere of influence, Gilbert's *orbis virtutis*, or field of force, surrounding a magnet. It also contains the first metrical composition on the magnet written in English. Norman was an instrument maker who lived at Limehouse, London. This is the third edition; the first edition appeared in 1581, and the second edition in 1585. (See No. 20, 256a, 823.)

66a.— —Another edition. 4 l.+43 pp. 12mo. London. 1720  
There are three copies of this reprint in the Wheeler Gift.

67. **Porta, Johannes Baptista della.** (1538-1615.) *De occultis literarum notis seu artis animi sensa occulte aliis significandi, aut ab aliis significata expiscandi enodandique.* Libri iii. 8 l.+275+24 pp. ill. Montisbeligardi, apud Jacobum Foillet.

Montbeliard, 1593

Extensive work on cryptography, or the use of secret characters, a subject which attracted considerable attention at the time.

—See also 47.

68. **Bodin, Joannes.** (16th Century.) *Universae naturae theatrum, in quo rerum omnium effectrices causae et fines quinque libris discutiuntur.* 4 l.+633 pp. 8vo. Lugduni, apud Jacobum Roussin. Lyons, 1596

Extensive work on natural philosophy; p. 243 contains a brief answer to the question "Why does a magnet draw iron to itself?" On p. 255, the words *electrum, succinum, electron* occur in answer to the question "What is amber?"

69. **Barlow (or Barlowe), William.** ( ? -1625.) *The Navigator's Supply, containing many things of principal importance belonging to navigation, with the description and use of diverse instruments framed chiefly for that purpose, but serving also sundry other of cosmography in general.* 50 l. ill. 7 plates. Sm. 4to. London, G. Bishop. London, 1597

Barlowe, Archdeacon of Salisbury, was a distinguished mathematician and was among the earliest English writers on the properties of the magnet. This celebrated tract of his opens with a detailed description of the sailing compass, including the two rings for its suspension. A compass for determining the "variation" is also minutely described. Very rare, being the only edition.

—See also 89.

70.\* **Maiolus (or Majolus), Simon.** (1520-1597.) *Dies caniculares, seu colloquia tria & viginti, quibus pleraque naturae admiranda, quae aut in aethere sunt, aut in Europa, Asia,*

CATALOGUE OF WHEELER GIFT

atque Africa, quin etiam in ipso orbe novo, & apud omnes  
Antipodas sunt recensentur. 8 l.+1177 pp.+1 l. 4to. Romae,  
ex officina J. A. Ruffinelli. Rome, 1597

Properties of the lodestone, p. 780; *Ethiopian magnet* said to repel iron, p.  
781; magnetic clock of Gerbert (Pope Sylvester II.), p. 783. The author  
was an Italian prelate.

70a.——Another edition. 4 l.+1248 pp.+30 l. Folio. Moguntiae,  
Joannis Godofr. Schonwetteri. Mayence, 1625

70bis. **Stevin**, Simon. (1548-1620.) The haven-finding art; or, the  
way to find any haven or place appoynted at sea by the  
latitude and variation. Translated into English (by E.  
Wright). 20 pp. ill. 4to. (no title-page.) (London, 1597)

Translation of the *Portuum investigandorum ratio* of Stevin or Stevinus,  
the Flemish mathematician and engineer. Places of no variation, p. 6.

—See also 107.

71. **W(right), E(dward)** (1560?-1615.) Certaine errors in navigation,  
arising either of the ordinarie erroneous making or using of  
the sea chart, compasse, crosse staffe, and tables of declination  
of the sunne, and fixed starres detected and corrected by E.  
W. 126 l. ill. pl. Sm. 4to. London, Valentine Sims.

London, 1599

Chap. 6 of this treatise describes the errors caused in sailing by neglecting  
the "variation," and shows how they may be avoided. Wright was a practical  
navigator as may be seen from the "Table of observations of the  
variation of the compass" taken on sea and land in his voyage to Fayal  
in 1589. He was lecturer on navigation to the East India Company. His  
laudatory address prefaced to Gilbert's *De Magnete* is well known. (See  
No. 72.)

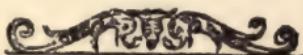
71a.——Certaine errors in navigation, detected and corrected by Edward  
Wright with many additions that were not in the former  
edition as appeareth in the next pages. 26 l.+427 pp.+122 pp.  
+12 l. Ill., two maps. Sm. 4to. London, Felix Kingston.

London, 1610

Engraved title page,  $4\frac{1}{4} \times 6\frac{1}{4}$  ins., in duplicate, the lower part containing  
map of the world,  $4\frac{1}{4} \times 2\frac{3}{4}$  ins. Map of the world on Mercator's projection  
in two parts, each  $15 \times 20$  ins., signed "William Kip, sculpsit"; a note gives  
the name of some of the observers whose data on the variation of the compass  
are used in the map (Davis, Kendall, Hall, Lynschot, Candish and John  
De Castro). The second map,  $19\frac{1}{4} \times 14\frac{1}{4}$  ins., has the legend "A particular  
sea chart for the Islands Azores." The engraved title page is not in the  
1599 edition, nor the two large maps. The pagination passes from p. 52  
to p. 55 and from p. 182 to p. 185, without interruption of the text. Pp.  
441-456 are missing, interrupting the text, apparently due to an error in  
the numbering of the signatures which misled the binder; the missing portion  
in part includes the first pages of "An Answer to Simon Stevin" (See  
pp. 214-224, edition of 1657). The final 122 pages, called "The division of  
the whole art of navigation" are separately paged, and not contained in the  
edition of 1599. (See No. 70bis.)

C. H. Coote in discussing the extremely rare map of the world sometimes  
found bound in Hakluyt's "Hydrographical Description" says: "The conclu-  
sion is therefore irresistible, that whatever may be due to Molineux or

MAGIAE NATURALIS,  
SIVE  
DE MIRACVLIS  
RERVM NATURALIVM  
LIBRI IIII.



IO. BAPTISTA  
PORTA NEAPOLITANO  
AUCTORE.



Ad nouu[m] Bacc. Fris[us] Cesaris Lugoruei Taberne, Cy. & J. Augusti  
NEAPOLI  
APVD MATTHIAM CANCER.

M. D. LVIII.

QVM GRATIA ET PRIVILEGIO  
PER DECENNIVM.

47. PORTA. (Reduced.)



47b. PORTA—*Portrait of Author. (Reduced.)*

## CATALOGUE OF WHEELER GIFT

Hakluyt in the execution of the original [Hakluyt map] it also represents the first map upon the true projection by Edward Wright . . . The truth is, that to Wright and not to Mercator is due the honor of being the first to demonstrate the true principles upon which such maps were to be laid down by means of the now well-known Table of meridional parts."

71b.—Certain errors in navigation. Detected and corrected by Edward Wright. With many additions that were not in the former edition. 14 l.+224 pp.+110 pp.+1 l.+20 pp. Ill., one map, 4to. London, Joseph Moxon. *London, 1657*

Engraved title-page,  $4\frac{1}{2} \times 7$  ins., differing in some details from that of the 1610 edition. Contains a dedication and an address to the reader, signed by the publisher, Joseph Moxon. Inserted is a letter by Prof. S. P. Thompson addressed to Mr. Latimer Clark, pointing out that the section on "The Haven-finding Art." (20 pp.) is a translation from Stevinus (See No. 70 bis). The Map ( $15\frac{1}{4} \times 10\frac{3}{4}$  ins.) is entitled "A Particular Platt, for sailing to the Isles of Azores."

—See also 87.

72. Gilbert, William. (1544-1603.) *De magnete, magneticisque corporibus, et de magno magnetе tellure, physiologia nova, plurimis et argumentis et experimentis demonstrata.* 8 l.+240 pp. ill. Sm. folio. Londini, excudebat Petrus Short.

*London, 1600*

First edition of a remarkable work in the history of scientific discovery. It cost the author eighteen years of investigation and experiment. Large marginal asterisks mark what he considered great discoveries, and small asterisks minor ones. There are 21 of the former and 178 of the latter. Gilbert shows that a freely suspended magnet is controlled by the earth and not, as supposed, by extra-terrestrial influence. His magnetic theory enabled him to explain the behavior of the compass-needle, the dip-needle, the magnetic condition of vertical masses of iron, and the magnetic properties of heated iron bars when allowed to cool while lying in the magnetic meridian. Book ii., contains his *electrical work* and shows a great advance on previous writers. Gilbert is chary of praise and wrathful in denunciation; he was a staunch Copernican, and warm friend of Kepler and Galileo. Inserted in the volume is a portrait of Gilbert engraved by Champ from an original portrait in the Bodleian library, Oxford, now lost. The engraving was extracted from S. & E. Harding's *Biographical Mirror*, 1796, vol. ii., p. 33. Among publications relating to Gilbert, in addition to those entered below are the following which are not in the library. *Peter Short, printer, and his works*, 30 pp., ill. (A paper read by Prof. S. P. Thompson before the Bibliographical Society, May 17, 1897 and reprinted, 1898.) This paper traces the origin of the prominent printer's mark on the title-page of *De Magnete*, 1600. *Souvenir of William Gilbert's tercentenary year*, 16 pp., ill. (Presented by the Mayor of Colchester on the occasion of the Colchester Oyster Feast, October 20, 1904.) The souvenir contains a reproduction of Gilbert's engraved portrait, and of the title-pages of the 1600 *De Magnete* and of the *Philosophia Nova* (See 131); also a photographic facsimile of a deed signed by Gilbert (W. Gylberd), a photographic view of his birth-place and monument, and a half-tone reproduction of the tercentenary picture in the Colchester town-hall, a copy of which was presented by the British Institution of Electrical Engineers to the American Institute of Electrical Engineers. Dr. Benjamin Ward Richardson is the author of an article of 15 pages printed in the *Asclepiad*,



53. TAISNIER—*Portrait of Author.* (Reduced.)

## To the Reader.

For the more careful and orderlie handling of such inatters  
as are necessarilie incident to this presente treatise : All  
which I haue bene content to doe, that the worke(though  
it bee not big, yet effectuall) by the common vse thereof,  
may yeld profit accordingly, to them specially that are of  
capacitie to comprehend this new reuealed secret. To con-  
clude, the chiefeſt and onely marke wherat I lay leuell,  
was the benefiting of my Cuntrie-men, in whom I wish  
continuall increaſe of knowledge and cumminge, as in all  
other commendable profeſſions, ſo chieflie in thoſe that  
are moſt neceſſarie and profitablie. Thus bequeaſhing  
my trauaile heerein to thy diſcretē conſtruction  
and wiſhing thy furtherance in thiſ moſt  
neceſſarie and profitablie knowledge,  
I leane thee to the diſtrictiōn  
of Gods hoſt Spirit.  
Fare-well.

Robart Norman.



66. NORMAN.

## CATALOGUE OF WHEELER GIFT

1884, having for title "The First Electrician, William Gilbert, M. D." With the acknowledged assistance of Mr. Menzies, Dr. Richardson gives in full for the first time in English dress Gilbert's address (his preface) to "the candid reader and student of magnetic philosophy." The *U. S. Magnetic Declination Tables*, 1902, contains an article of about 4500 words by Dr. L. A. Bauer on *De Magnete*. (See also note, 2447bis, Hellmann.)

72a.— —Tractatus, sive physiologia nova, De magnete, magneticisque corporibus et magno magnete tellure, sex libris comprehensus. Omnia emendatius edita, aucta et figuris illustrata, opera et studio W. Lochmans, with plates and engravings. 10 l.+232 pp.+17 l. ill. Sm. 4to. Sedini, typis Gotzianis.

Stettin, 1633

Wolfgang Lochmann of Stettin brought out an edition of *De Magnete* in 1628 (very rare) which was the first one published abroad. This was followed by the present edition in 1633, which contains a preface by Lochmann; also the famous idyll of Claudio (4th Century) on the magnet. (See No. 55.) Mr. Conrad Cooks has recently found a copy of the 1628 Stettin edition with a new title page bearing the imprint, Frankfort, a/m, 1629. Signature of *Fr. Arogo* on title page.

72b.†——Gilbert's Fables. By Thomas Commerford Martin. (Extract, North American Review, Vol. 146, No. 4, April, 1888, pp. 405-415.) 8vo.

New York, 1888

A popular account of Gilbert and his work; growth of telegraphy and electric illumination; comparison of illuminants. "His airy 'fables' (as Chancellor Bacon called them) have resolved themselves into some of the most solid benefits that science has conferred on mankind."

72c.†——(Circulars relating to Gilbert Club and the translation of *De Magnete*.)

London, 1889-1901

1. Objects of the proposed Gilbert Club, 1889. 2. Statement of action at inaugural meeting, and announcement of details of the translation and its publication, 1890. 3. Rough specimen sheet, title-page and page of text, 1901. 4. Names of those who took part in translation and editing, and of printers and binders.

72d.†——William Gilbert, of Colchester. By Conrad William Cooke. (Extract, Engineering, Vol. 48, pp. 717-718+729-730.) 12 pp. 8vo.

London, 1890

Biographical notice; letter to Archdeacon Barlowe; testimony of Dr. Fuller: "Dr. Gilbert's book on magnetism published in 1600, is one of the finest examples of inductive philosophy that has ever been presented to the world. (Thomson *History of the Royal Society*, London, 1812.)

72e.——Gilbert of Colchester, an Elizabethan magnetizer. (By Prof. Silvanus P. Thompson, F.R.S.) 63 pp. Sm. 4to.

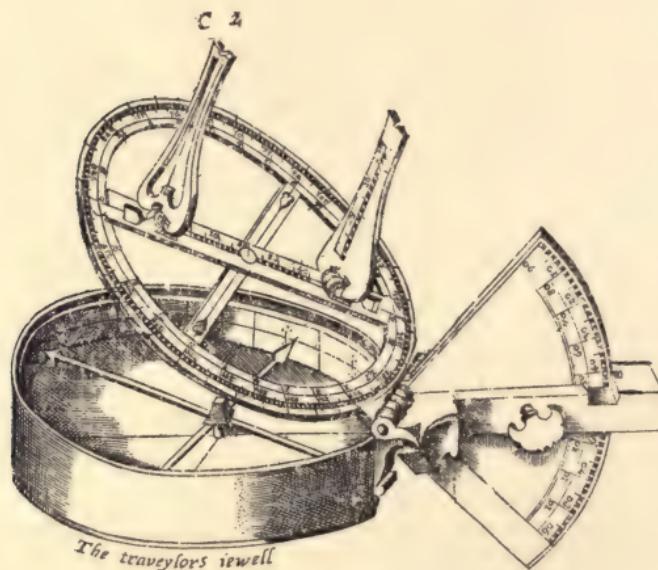
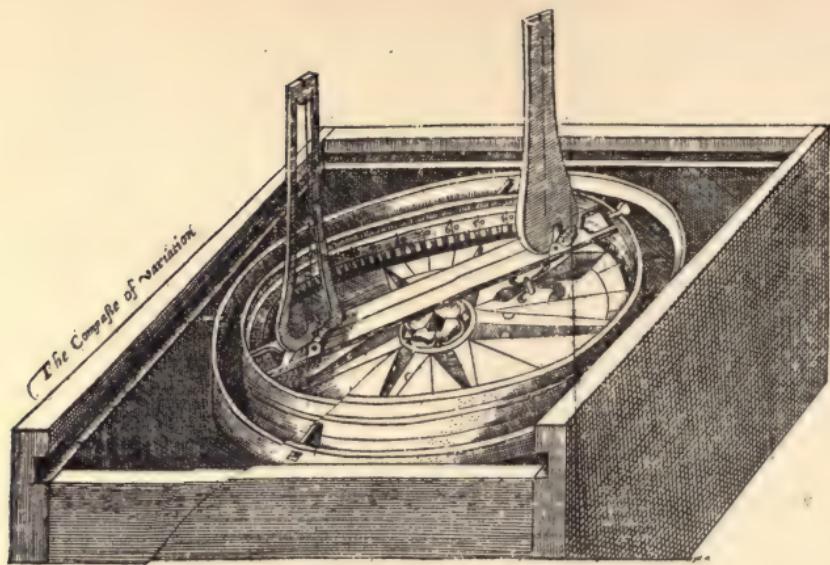
London, 1891

Account of Gilbert's life and scientific discoveries, followed by a list of his works. The last fifteen pages are devoted to the bibliography of "The Sette of Odd Volumes," of which the above is one.

72f.——Facsimile reprint of London folio of 1600. 8 l.+240 pp. Small folio. Berlin, Mayer & Mueller.

Berlin, 1892

A photo-zincograph reproduction.



69. BARLOW. *Mariner's Compass.*

CATALOGUE OF WHEELER GIFT

72g.†—William Gilbert of Colchester, Physician of London, on the loadstone and magnetic bodies, and on the great magnet, the earth. A new physiology demonstrated with many arguments and experiments. A translation by P. Fleury Mottelay. 54 +368 pp. 8vo.

New York, 1893

Reduced reproduction of title-pages of 1600, 1628 and 1633 editions. Frontispiece portrait. Gilbert's arms. Biographical memoir, with Address of Edward Wright. Reduced reproduction of title-page of Gilbert's *De Mondo Nostro* of 1651. (See No. 131.) This is the first complete translation of Gilbert's *De Magnete* into a modern language. The foot-notes are numerous and of considerable historical and bibliographical value. Mr. Paul F. Mottelay is the author of a valuable *Bibliographical History of Electricity and Magnetism* which will soon appear in book form.

72h.†—William Gilbert of Colchester, physician of London. On the Magnet, and on the great magnet, the earth; a new physiology demonstrated by many arguments and experiments. (Translation by the Gilbert Club.) 246 pp., ill. Large 8vo. Imprinted at the Chiswick Press, anno MCM.

London, 1900

The Gilbert Club was formed under the presidency of Sir William Thomson (Lord Kelvin) for the purpose of preparing a translation of Gilbert's *De Magnete*. Following are the names of those who took part in the translation or revision: Rev. A. W. Howard, Mr. G. T. Dickin, Mr. Edward Little, Prof. R. A. Sampson, Prof. Meldola, Mr. Latimer Clark, Sir B. W. Richardson, Rev. W. C. Howell, Prof. Silvanus P. Thompson, Dr. Joseph Larmor. This version is, as far as circumstances permitted, a facsimile in English of the original Latin folio edition of 1600. The translation corresponds page for page; the cuts and the ornamental initial letters have been either recut or reproduced in facsimile. A short index has been added to facilitate consultation. The edition was limited to 250 copies.

72i.†—Notes on Gilbert's *De Magnete*. (By Prof. Silvanus P. Thompson, F.R.S.) Privately printed. London, MCMI. 68 pp. Large 8vo.

London, 1901

Valuable literary, historical, geographical and bibliographical notes, including many references to works of authors quoted by Gilbert and to other writings of related interest, with a detailed bibliography of *De Magnete*. On p. 52 is a reproduction of the original engraving followed by the artist who prepared the cut in *De Magnete*, representing a blacksmith at his forge, and which was re-engraved, with changes, for the 1628 and 1633 editions. The Notes are bound with copies of the translation of *De Magnete* issued to members of the Gilbert Club.

72j.†—Gilbert of Colchester. The tercentenary of electric and magnetic science. 14 pp., frontispiece portrait, ill. By Brother Potamian, D.Sc. (Reprint, Popular Science Monthly, September 1901.) 8vo.

New York, 1901

Biographical sketch with criticism of Bacon's belittling remarks; parallel between Gilbert and Bacon; analysis of Gilbert's work in electricity, magnetism and terrestrial magnetism. "If any one deserves to be called the founder of the experimental school of philosophy, we contend that it is not Bacon the thinker and essayist, but Gilbert the methodical worker and fruitful discoverer."

P. H. Est compertissima omnibus hæc Asbesti vis, ut semel acescens ex eo ignis numquam restinguatur: nam Diuus Augustinus verum omnium peritia illustris de eo quoque pluribus agit de Cibit Dei lib. 21. cap. 5. & cap. 6. Recolit enim Veneris templo adhibitum cum lucerna candelabrum, quæ sub dio cum noctu, dieque arderet, nulla tamen tempestate, nullis imbribus extingui potuerat. Vnde necessarium fuit coniucere, sicut lapis, ita lucerna quoque, ac lychnus ex Asbesto constarent. Propterea de ipso Fano Veneris, ac lucerna inextinguibili ( inquit ) ita sentimus, ut in ea mechanicum aliquid de Asbesto ars humana molita sit: aut arte magica factum sit, quod homines illi mirentur in templo; aut demon quispiam sub nomine Veneris tanta se efficacia praesentauit, ut hoc ibi prodigium & appareret hominibus, & diutius permaneret. Hæc ille ex veterum annalibus. Cum igitur ea tanta Asbesti vis etiam Diuus Augustino pro comperta habeatur, non est, quod de ea ambigamus, sed rei rationem est impossibile assequi humano ingenio: diuinum id miraculum in lapide hoc inditum censendum est. Sed de lapidum naturis cum igne sat, superque diximus: nunc ad alios lapides conuertenda nostra oratio est; primumque de Magnete.

E. Q. Magnes præ cæteris omnibus naturæ arcana multa continet, neque ad integrum vis eius humano generi comperta est, ut censeo: propterea de ipso solo librum scripsit docissimus Ioannes Baptista à Porta Neapolitanus, longe plures, quam tentenos eius effectus enumerans incredibili solertia, & obseruatione.

T. H. Dubio procul nemo mente assequi eius naturam, vimque, ac rationem umquam potuit ad integrum: præsertim qua ratione ferrum sua natura gratissimum ad se levissime trahat: propterea virtute cælesti id illi esse inditum, nulla autem elementali vi tradidit sancti viri, & in ijs præcipius Diuus Thomas Aquinas quodlib. 12. art. 15. Quamobrem ne frustra disquirendæ eius rei causæ incumbamus, quam assequi non valeamus, differendum puto de rebus memorabilibus, quæ ob eam Magnetis vim acciderunt.

P. H. Exordiri libet ab eius lapidis origine, vbi inuenitus primus tradunt in Ida monte repertum primum ab homine, vnde nomen accepit, Magnete nuncupato, ut Nicander testatur, ac Plinius lib. 36. cap. 16. Inuenisse enim eum narrat ob clavos ferreos crepidarum, & baculi cuspidem ferream, cum solo nimis velut tracta hæcerent, cum armata paterent. Id quoque scribit Isidorus lib. 16. cap. 4. qui & illud adiicit, ferrugineum colorem illi esse, atq; ideo ferrum apprehendere, velut cognitione naturæ complectendum attrahere.

CATALOGUE OF WHEELER GIFT

72k.†—William Gilbert of Colchester. A sketch of his magnetic philosophy. By Charles E. Benham. 103 pp., 2 plates. Sm. 4to. *Colchester, 1902*  
A popular sketch of Gilbert and his philosophy: "The man, wherein his genius lay, his faults and failings, the essential qualities of his work without a laborious following out of his innumerable experiments and arguments." A full-page representation is given of Gilbert's tomb in Holy Trinity Church, Colchester.

72l.†—Gilbert, Physician: A note prepared for the three-hundredth anniversary of the death of William Gilbert of Colchester, president of the Royal College of Physicians, & physician to Queen Elizabeth, by Silvanus P(hillips) Thompson, F.R.S. 32 pp. Sm. 4to. Chiswick press. *London, 1903*  
A biographical sketch, with especial reference to Gilbert's career as physician.

72m.†—William Gilbert, and terrestrial magnetism in the time of Queen Elizabeth: A discourse by Silvanus P(hillips) Thompson, F.R.S. 16 pp. Sm. 4to. Chiswick press. *London, 1903*  
A paper read before the Royal Geographical Society, March 23, 1903. Includes an interesting account, with bibliographical references, of the knowledge of the compass to the time of Gilbert.

72n.†—The family and arms of Gilbert of Colchester. By Silvanus P(hillips) Thompson (Reprint, Transactions Essex Archeological Society, vol. ix, 1904) 15 pp., 1 plate, genealogical chart, ill. 4to. *London, 1904*  
A paper read before the Essex Archeological Society at its Jubilee. The genealogy commences with Thomas Gilbert, a burgess of Colchester, born 1428. An appendix gives a list of the considerable property possessed by Gilbert at his death.  
—See also 131.

73. **Sunde**, Janus Hercules de. (pseud. of Daniel Schwenter.) (1585-1636.) *Steganologia & Steganographia aucta, Geheime, Magische, Natuerliche Red- unnd Schreibkunst.* 121. + 370 pp. + 61. ill. 16mo. Nuernberg, Simon Halbmayers. *Nuremberg, (1600)*  
This rare book gives a lengthy and interesting description of magnetic signaling, p. 127; the operator calls up his friend by ringing a bell by means of a bar-magnet; the needles are also moved by bar-magnets and the letters formed by one or more strokes to the right and the left as in the modern needle telegraph. Signaling by means of mirrors, p. 136. The date given above is from the Catalogue of the British Museum. (See Nos. 90, 190, 193.)  
—See also 110 bis.

74. **Blundeville**, (Thomas). (1530 (?) —.) The theoriques of the seuen planets, shewing all their diuerse motions, and all other accidents, called Passions, thereunto belonging. Whereunto is added by the said Master Blundeville a breefe extract by him made of Maginus his Theoriques, for the better understanding of the Prutenicall tables, to calculate thereby the diuerse motions of the seuen planets. There is also hereto added, The making, description, and use of two most ingenious & necessarie instruments for sea-men to find

Certaine  
ERRORS IN  
NAVIGATION,

Arising either of the ordinarie erroneous making or vsing of the sea Chart, Compasse, Crossc staffe, and Tables of declination of the Sunne, and fixed Starres detected and corrected.

By E. W



Printed at London by Valentine  
3 Sims. 1599.

Amicissimo suo Georgio Estey in perpetuam  
amicitiae memoriam Edw: Wright D.D.

71. WRIGHT.

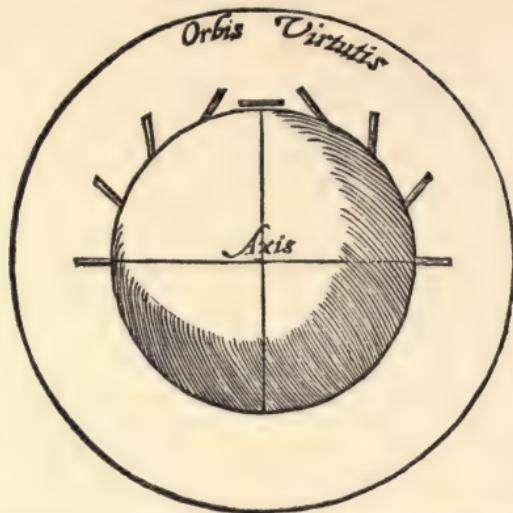
Certaine  
**ERRORS IN  
NAVIGATION,**  
Detected and Corrected  
By Edu: wright  
With

Many additions that were  
not in the former edi-  
tion as appeareth  
in the next

pages  
Printed by F. de la Croix at London 1615.



71a. WRIGHT. (Reduced.)



Quò propiores fuerint partes æquinoctiali, cò magis oblique alliciunt magnetica; at polis viciniores partes magis directè aduocant, in polis directissimè. Eadem etiā ratio est conuersionis magnetū omnium qui sunt rotundi & qui sunt longi, sed in longis experimentum est facilius. Nam in quāuis formā est verticitas, & sunt poli; sed propter malam formam & inæqualem, sæpiùs quibusdam malis impediuntur. Si lapis longus fuerit, vertex verò in finibus, non in lateribus; fortiùs in vertice allicit. Conferunt enim partes vires fortiores in polum rectis lineis, quām obliquis. Sic lapis, & tellus naturā conformant motus magneticos.

## C A P. VII.

De potentia virtutis magneticæ, & naturâ  
in orbem extensibili.

**G**uidatur virtus magnetica vnde quaque circa corpus magneticum in orbem; circa terrellam sphærice; in alijs lapidum figuris, magis confusè & inæqualiter. Nec tamen in rerum natura sublîstit orbis, aut virtus per aërem fusa permanens, aut essentialis; sed magnes

72. GILBERT. (Reduced.)

CATALOGUE OF WHEELER GIFT

out thereby the latitude of any place upon the sea or land, in the darkest night that is, without the helpe of sunne, moone or starre. First invented by Doctor Gilbert and now set downe by Master Blundeville. 3 l.+292 pp. ill. pl. Sm. 4to. London, Adam Islip.

*London, 1602*

The author recognizes his indebtedness to Gilbert, p. 279, for two magnetic instruments held to be useful for finding the position of a ship at sea. The method is based, however, on two errors into which Gilbert had fallen, *viz.* (a) that the magnetic equator and magnetic poles coincide with those of the earth; (b) that the isoclinic lines coincide with parallels of latitude. This quaint work was published during Gilbert's lifetime.

—See also 91.

75. **Nautonnier**, Guillaume de. (Sieur de Castelfranco.) *La mécomètrie de l'eymant c'est-à-dire la manière de mesurer les longitudes par le moyen de l'eymant par laquelle est enseigné un très certain moyen, auparavant inconnu, de trouver les longitudes géographiques de tous lieux, aussy facilement que la latitude. Davantage y est démontré la déclinaison de la guideymant pour les lieux.—Mécographie de l'eymant, c'est-à-dire la description des longitudes trouvées par les observations des déclinaisons de l'eymant.* 16 l.+12 pp.+2 l.+327 pp.+6 l.+32 pp. ill. map. Folio (title-page missing.) Venes et Tolose, chez l'auteur et chez Raimond Colonies à Courteneufue.

*Venes & Toulouse, 1603-1604*

Elaborate treatment of the magnet as a means of determining longitude. The method was based on erroneous assumptions. The figures on pp. 239, 240, 246 are specially interesting. Engraved title page to each part; that of part 2 reads: *La mécographie de l'eymant. . . .*

76. **Morales** (otherwise Albero), Gaspar. (— — —.) *Libro de las virtudes y propiedades maravillosas de las piedras preciosas.* 8 l.+378 pp.+4 l. 12mo. Madrid, Luis Sanchez.

*Madrid, 1605*

Very rare work on precious stones; the chapter on the lodestone is a repetition of fabulous properties attributed to it; such as that it cures dropsy and is an antidote against poison.

77. **d'Acosta**, José. (1539-1600.) *Histoire naturelle et morale des Indes, tant Orientales qu'Occidentales.* Où il est traitté des choses remarquables du ciel, des élémens, métaux, plantes & animaux qui sont propres de ces pais. Ensemble des moeurs, cérémonies, loix, gouvernements & guerres des mesmes Indiens. Composée en castillan par Joseph Acosta, & traduite en françois par Robert Regnault Cauxois. Dernière édition, revue & cor. de nouveau. 8 l.+352 pp.+18 l. 12mo. Paris, Marc Orry.

*Paris, 1606*

Power communicated to iron when rubbed with a lodestone, p. 34; polarity developed by such rubbing, p. 35; "variation," p. 35, where it is said that there are four places known in which there is no variation. Chap. xxix mentions properties of amber other than electrical. The author, a Spanish Jesuit, lived for some time in Peru.

## Zum dritten.

Auff zwö oder drey Meil / ei-  
nem/den man weder sehen noch hören  
kan/durch einen Compasen etwas  
zuversiehen zugeben.

**S**ieh dieses ein sonderlich Secret vnd  
Geheimnus / hab ich es auch geheim  
blshero gehalten / daß es nichteinjed  
der Bauer verstanden/vnd deßhalb in der ers-  
sien edition wort gebrauchet / welche nur ge-  
lehrt Chymici, Physici vnd Medici verstan-  
den. Jetzt aber will ichs dem Kunstliebenden zu  
guten wie die Kunst für sich selbst ist / an Tage  
geben. Es ist aber die ganze Kunst daran gele-  
gen daß man ein Eisen in form eines spitzigen  
Diamantes also zurthele/ daß es ein Magnet  
züglein auff zwö oder drey Meil bewegen  
könne/im Krekel wohin man will/wollen also  
den Compasen vñ das Eisen schren zurthele.  
Erßlich werden zweien Compasen zu je-  
richtet in der vierung einer hand breite / kleinere  
oder größer/mit dem Züglein/ daß doch mit  
dem Magnet nicht bestrichen wird / einer wie  
der ander / darin werden mit zweyen Kreuz-  
sirecken

CATALOGUE OF WHEELER GIFT

78. **Harward, Simon.** (— — .) A discourse of the severall kinds and causes of lightning written by occasion of a fearefull lightning which in the 17 November, 1606, did burne up the spire steeple of Blechingley. 12l. Sm. 4to. London, John Windet. *London, 1607*  
This curious discourse contains an allusion to the efficiency of guns and bells in averting the dangers of lightning. "By the stirring of the aire, the cloudes may be the sooner dispersed and driven away."

79. **Scaliger, Julius Caesar.** (1484-1558.) Exotericarum exercitationum liber xv. De Subtilitate ad Hieronymum Cardanum. 8 l.+1129 pp.+46 l. 12mo. Francofurti, apud Claudium Marnium. *Frankfort, 1607*  
Italian scholar and critic (Della Scala): how a magnet may lose its strength, p. 374; the lodestone in general, p. 446; magnetic attractions and repulsions, p. 1074. Some of Scaliger's opinions and statements were criticized by Gilbert, which elicited from Joseph Justus Scaliger, the philologist, depreciatory remarks about "a certain Englishman who produced a book on the magnet three years ago which has not justified the expectations formed of it." (See No. 37.)

80.\* **Solinus, Caius Julius.** (3d Century.) Polyhistor, vel, rerum toto orbe memorabilium thesaurus. Hac postrema editione adiectus est Pomponii Melae liber de Situ Orbis. 8 l.+203 pp.+2 l.+110 pp. 12mo. Lugduni, Claudio Larjot. *Lyons, 1609*  
This work on ethnography and natural history was written probably in the 3rd Century; it is a compilation from Pliny; references to "lychnites" and the lodestone, p. 188; biographical notice of the author.  
—See also 16.

81.\* **Alsted, Johann Heinrich.** (1588-1638.) Compendium physicae in quinque partes. 110 pp. 16mo. Herbornae Nassoviorum. *Herborn, 1610*  
Treats briefly of the world, plants, minerals, meteors, the elements; tides, p. 71; and the magnet, p. 90.

82. **Arlensis, (de Scudalupis) Pierre.** (Fl. 1580.) Sympathia septem metallorum, ac septem selectorum lapidum ad planetas. 2 l.+pp. 245-470+35 l. 12mo. Parisiis, David Gillius. *Paris, 1610*  
The author, Peter of Arles, states, p. 275, that he tried to work a pair of sympathetic compasses after the manner described by Porta but failed; p. 442, the lodestone is said not to be a metal because it is not metallic throughout; p. 452, the declination for Paris is given as 7° or 8° E; p. 454, Cardan is quoted as saying that the lodestone attracts silver; p. 441, Gilbert is spoken of as *doctissimus vir*; p. 453, loss of magnetic properties by heat. The first edition was published in Rome; it was republished in Madrid in 1602. This is the third and re-edited edition. The first edition appeared about 1540.  
—See also 83.

83. **Leonardus, Camillus.** (16th Century.) Speculum lapidum; cui accessit Sympathia septem metallorum ac septem selectorum lapidum ad planetas D. Petri Arlensis de Scudalupis. 22 l.+499 pp.+52 l. portr. 12mo. Parisiis, Carolus Seuestre. *Paris, 1610*  
Celebrated treatise on gems, original edition, 1502. Reference to *succinum*

# THE Theoriques of the seuen Planets, shewing all their diuerte motions, and all other Accidents, cal- led Passions, thereunto belonging. Now more plainly set forth in our mother tongue by M. Blundevile, than euer they haue been heretofore in any other tongue whatsoeuer, and that with such pleasant demonstratiue figures, as eue- ry man that hath any skill in Arithmeticke, may easily understand the same.

A Booke most necessarie for all Gentlemen that are desirous to be skil-  
full in Astronomicie, and for all Pilots and Sea-men, or any others  
that loue to serue the Prince on the Sea, or by the  
Sea to trauell into forraigne Countries.

Whereto is added by the said Master  
Blundevile, a breefe Extract by him made, of *Magi-  
nus* his Theoriques, for the better vnderstanding of the  
Putenicall Tables, to calculate therby the diuerte mo-  
tions of the seuen Planets.

There is also hereto added, The making, description,  
and vse, of two most ingenious and necessarie Instruments for  
Sea-men, to find out thereby the latitude of any Place vpon the Sea  
or Land, in the daykeft night that is, without the helpe of Sunne, Moone, or Starre.  
First invented by M. Doctor Gilbert, a most excellent Philosopher, and  
one of the ordinarie Physicians to her Maiestie: and now here  
plainely set downe in our mother tongue by  
Master Blundevile.



LONDON,  
Printed by Adam Islip.  
1602.

74. BLUNDEVILLE. (Reduced.)

## CATALOGUE OF WHEELER GIFT

or yellow amber and *gagates* or black amber, p. 108. Varieties of lodestone, p. 128. First instance of *filar* suspension used for magnets, p. 129. (See No. 82.) The book is dedicated to Caesar Borgia.

83a.——(English translation.) The mirror of stones, in which the nature, generation, properties, virtues and various species of more than 200 different jewels, precious and rare stones are distinctly described. Now first translated into English. 240 pp. 12mo. London, for Freeman. *London, 1750*

Translation of famous book on gems: *lyncurius*, p. 116; *ligurius*, p. 118; the lodestone, p. 206; diamond and garlic myths, p. 207; magnet suspended by a fiber, *filar* suspension, p. 207. Book III (engraved stones) omitted.

—See also 5.

84. **Bongars, Jacques.** (1554-1612.) *Gesta Dei per Francos, sive Orientalium expeditionum et Regni Francorum Hierosolimitani historia a variis, sed illius aevi scriptoribus, litteris commendata; nunc primum aut editis, aut ad libros veteres emendatis. Auctores praefatio ad lectorem exhibet. Orientalis historiae tomus primus (et secundus).* (Vol. 2 by Marino Sanuto Torsello, has special title-page:) *Liber secretorum fidelium crucis super Terrae Sanctae recuperatione et conservatione quo et Terrae Sanctae historia ab origine & eiusdem vicinarumque provinciarum geographica descriptio continetur.* Cuius auctor Marinus Sanctus dictus Torsellus patricius venetus. Nunc primum, cum libello eiusdem argumenti, sine auctoris nomine, ex mss. veteribus editus. 2 vols. in 1. 1263+373 pp. Folio. Hanoviae, heredes Joan. Aubrii.

*Hanau, 1611*

The history of the Orient from p. 1051 to p. 1145 of this celebrated work is taken from Cardinal Jacques de Vitry, who died in Rome in 1244. In these pages, we find the earliest reference by a European writer to the use of the magnet for navigating purposes, p. 1106; *gagates* and *lyncurium* are mentioned on p. 1107. Cardinal de Vitry wrote his famous history of Jerusalem about the year 1218. The name of *Peregrinus* occurs on fol. (e).

85. **Goclenius, Rodolphus** (the younger). (1572-1621.) *Tractatus novus de magnetica vulnerum curatione, citra ullum et dolorem et remedii applicationem et superstitionem.* Huic annexus est alter, *de luxuriosis ac portentosis nostri seculi conviviis.* 4 1.+174 pp. 12mo. Francofurti, impensis Petri Musculi. *Frankfort, 1613*

Book on "Natural Magic," a favorite subject of the time: supposed magnetic cure of wounds, p. 88. (See Nos. 113, 119, 120, 152.)

—See also 119.

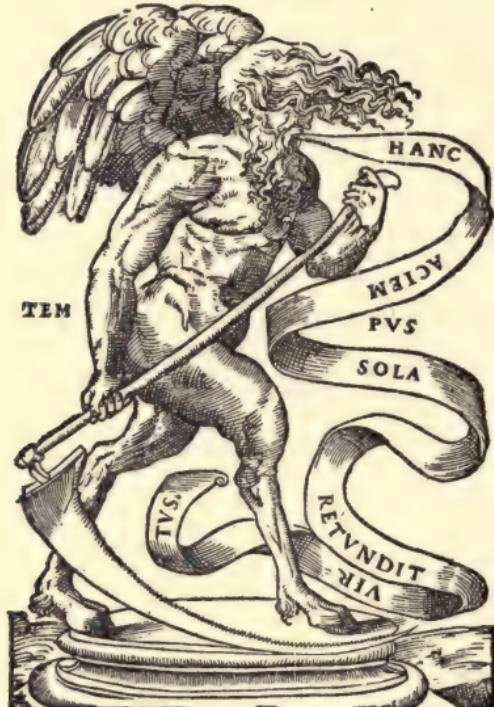
86. **Ridley, Mark.** (1560-1624.) A short treatise of magneticall bodies and motions. 71.+158 pp. ill. portr. Sm. 4to. London, Nicholas Okes. *London, 1613*

This tract is based on Gilbert's *De Magnete* (see No. 72), whose labors are spoken of in the preface as "the greatest and best in magneticall philosophy."

# SECOND LIVRE DE LA MECOMETRIE DE L'EYMAN T.

Auquel est descrit l'usage, & pratique des preceptes contenus en la Theorique precedente; & enseigné comment par le moyen de la Guydeymant, il faut prendre les longitudes Geographiques de tout lieu proposé, soit par Terre, ou par Mer.

*De l'invention de Guillaume de Nautonnier, Sieur de Castelfrancé en Languedoc.*



*Avec Privilege du Roy.*

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M. D. C. IIII.

75. N.AUTONNIER. (Reduced.)

CATALOGUE OF WHEELER GIFT

Archdeacon Barlowe attacked Ridley in the first of electrical controversies, going so far as to claim that Ridley had stolen his manuscript and embodied its contents in this treatise. (See No. 89.)

87. Wright, Edward. (1560-1615.) The description and use of the Sphaere divided into three principal parts. 4 l.+104 pp. ill. Sm. 4to. London, for John Tap. *London, 1613*  
This little work treats exclusively of astronomical problems. The author, a distinguished mathematician, constructed a sphere which represented the motions of the moon and planets.  
—See also 71.

88. Foscarini, Paolo Antonio. (1580-1616.) Epistola circa Pythagorium, & Copernici opinionem de mobilitate terrae et stabilitate solis, et de novo systemate seu constitutione mundi. In qua Sacrae scripturae autoritates aduersus hanc opinionem adductae conciliantur. pp. 465-495+12 l. 4to. Napoli, Lazarus Scorrugius. *Naples, 1615*  
Astronomical systems of the world from the time of Pythagoras to that of Copernicus. The author, a Carmelite monk, defends the Copernican system.

89. Barlow (or Barlowe), William. (?-1625.) Magneticall advertisements; or, Divers pertinent observations, and approved experiments concerning the nature and properties of the load-stone. 81.+86 pp.+1 l. ill. Sm. 4to. London, E. Griffin. *London, 1616*  
Compendium of what was known about the magnet and the mariner's compass in the author's time. In the preface he acknowledges his indebtedness to Gilbert. Appended to the tract is a letter from Gilbert to Barlowe which shows that he (Gilbert) intended to make important additions to his *De Magnetis*. (See No. 72 and note to No. 86.) The term *magnetisme* is said to occur for the first time in this work; see the 2nd page of *The Epistle Dedicatoire*. Kircher has the term *electro-magnetismus* as title to a chapter in his *Magnes sive de Arte Magnetica*, 1641. (See No. 116.) Barlowe was Archdeacon of Salisbury.

89a.— —New edition, with notes by William Sturgeon, xv+78 pp. ill. 1 pl. 12mo. London, Sherwood. *London, 1843*  
Sturgeon is well known for his magnetical investigations, author of numerous researches in electromagnetism.  
—See also 69.

90. Strada, Famianus. (1572-1649.) Prolusiones academicae. Nunc demum ab auctore recognitae, atque suis Indicibus illustratae. 61.+420 pp.+18 l. 12mo. Lugduni, apud Horatium Cardon. *Lyons, 1617*  
This work of the Italian Jesuit is noted for a poem on an imaginary magnetic telegraph, beginning p. 306. This telegraph consisted of two needles stroked by the same lodestone and attached to two separate, alphabetical dials. A metrical translation of this poem will be found in Hakewill's *Apologie* (See No. 99). The poem is referred to in *Spectator*, No. 241 and *Guardian*, No. 119. A similar arrangement of sympathetic magnets had been described by Porta in his *Magiae Naturalis*, 1589, Book vii (see No. 64); (see also No. 64), Sunde, *Steganologia* (No. 73); Bertelli (No. 17ii); Gherardi (No. 1799); Solly (No. 2875); Axon (No. 3857); Grimshaw (No. 3875); Jevons (No. 3878); Wheatley (No. 4156).



83. LEONARDUS.

CATALOGUE OF WHEELER GIFT

90a.— —Another edition; *Prolusiones academicae. Nunc secundo ab auctore recognitae, atque suis Indicibus illustratae.* 61.+420 pp.+17 l. 12mo. *Lugduni, sumptibus Jacobi Cardon et Petri Cavellat.*

*Lyons, 1627*

—See also 99, 102, 111, 213, 344, 874.

91. **Blundeville, Thomas.** (1530 (?) —.) His exercises, contayning eight treatises, the titles whereof are set downe in the next printed page: which treatises are very necessary to be read and learned of all young Gentlemen that have not beene exercised in such Disciplines, and yet are desirous to have knowledge as well in Cosmographie, Astronomie, and Geographie, as also in the Art of Navigation, in which art it is impossible to profit without the helpe of these, or such like illustrations. The sixth edition corrected and augmented. 7 l.+799 pp. ill. map, tab. Sm. 4to. London, William Stansby.

*London, 1622*

Chap. xxiiii. beginning p. 681 of this popularly-written work contains a description of the compass and its use in navigation. A method is given in Chap. xxvi. for determining the "Variation" at any place; the first edition appeared in 1594.

—See also 74.

92. **Zacarie (or Zachaire, Zachariae, Zacharias), Denis.** (1510-1556.) *Livre d'arithmétique et géometrie, avec l'art d'arpenter & mesurer toutes superficies de terre. Ensemble un traité de la boussole.* 4 l.+55+64+30 pp.+1 l. ill. 12mo. Paris, Nicholas Rousset.

*Paris, 1625*

This little book on the application of geometry contains an interesting chapter on the topographical use of the compass.

93. **(Van Etten, Henry) pseud.** (i.e. Jean Leurechon.) (1591-1670.) *Recreation mathematique, composee de plusieurs problemes, plaisants et facetieux, en fait d'Arithmetique, Geometrie, Mecanique, Optiq.; et autres parties de ces belles sciences.* 7 l.+188 pp. 5 plates, 12mo. Paris, chez Rolet Boutonne.

*Paris, 1626*

The author's real name was Jean Leurechon, a French Jesuit. Problem 74, p. 94, treats of the lodestone and of needles rubbed by it. On p. 96, it is said that the "variation" beyond the Fortunate Isles is about 8°. The next paragraph refers to sympathetic magnets and the possibility of communicating with persons at a distance by means of a dial-plate and movable magnet pivoted at the center. The author does not believe that any such magnets can be found. Diagram of magnetic telegraph, p. 94. This book acquired considerable celebrity; first edition, 1624; English translation, 1633. (See Bertelli, No. 1711; Gherardi, 1799.)

93a.— —Les recreations mathematiques, avec l'examen de ses problemes en Arithmetique, Geometrie, Mecanique, Optique; et autres parties de ces belles sciences. Premierement reueu par D(enis) Henrion, depuis par M. Mydorge et tout nouvelle-



86. RIDLEY. (Reduced.)

CATALOGUE OF WHEELER GIFT

ment corrige et augmente. Cinquieme et derniere edition. 8 l.+416 pp. ill. 16mo. Paris, Cardin Besongne.

Paris, 1659

Fifth edition of the celebrated work of the French Jesuit; disproves magnetic communication between distant persons, p. 161; armed lodestones, p. 161; demagnetization, p. 165; how to find the poles of a magnet, p. 166.

93b.— —(English translation.) Mathematicall recreations; or, a collection of sundrie problemes and experiments in arithmeticke, cosmographie, astronomie, architecture, chimistrie, etc., extracted out of the ancient and moderne philosophers, now delivered into English tonge, with the examinations, corrections and augmentations (by W. Oughtred). 21 l.+286 pp.+2 l. ill. 12mo. London, for Richard Hawkins. London, 1633

Problem 67, p. 103, is the interesting part of this work, referring as it does to the variation of the compass. This translation omits the statement contained in the original edition of 1624 that along the meridian of the Fortunate Isles (the Canaries), the needle points true north and south. The magnetic telegraph is described and pictured on p. 104. The author does not believe that any magnet with such properties can be found. The action of fire and garlic on the magnet is mentioned, p. 105.

93c.— —Another edition. Mathematical recreations; or, a collection of many problems extracted out of the ancient and modern philosophers written first in Greek & Latin, lately compil'd in French and now in English with the examinations and augmentations of divers modern mathematicians; whereunto is added, The description and use of the double horizontal dyal, by William Oughtred. 9 l.+282 pp.+1 l.+19 pp. ill. pl. 12mo. London, for W. Leake. London, 1674

The fable about Mahomet's coffin, p. 104; magnetic declination, p. 105; sympathetic compass, p. 106; how to find the poles of a lodestone, p. 107.

—See also 101, 151.

94.\* **Fromondus, Libertus.** (1587-1653.) Meteorologicorum libri sex. 6 l.+420 pp.+10 l. 4to. Antverpiae, ex officina Plantiniana, apud Balthasarem Moretum. Antwerp, 1627

Pulse used in calculating distance of thunder.

95. **Drebbel, C(ornelius).** (1572-1634.) Ein kurtzer Tractat von der Natur der Elementen, und wie sie den Wind, Regen, Blitz und Donner verursachen. Ins Hoch Deutsch uebergesetzt durch J. E. Burggraffen. 7 l.+25 pp. ill. 16mo. Franckfurt am Mayn, C. Roetell. Frankfort, 1628

Short treatise on the elements, containing a chapter, p. 16, on lightning and thunder. Bound with it is a translation of the same into Dutch, followed by a tract on the *Fifth Essence* permeating all things (ether?). Drebbel spent the last fourteen years of his life in London, where he was received with favor. He constructed a submarine boat in which he made a trip from Westminster to Greenwich.

95a.— —Grondige oplossinge van de natuuren eygenschappen der elementen en hoc sy veroorsaken donder blixem, hitte, koude, wind, regen, hagel, sneeuw etc. En waar toe sy dienstig zijn.

## *The Epistle Dedicatore.*

my selfe by the space of these forty yeeres, haue somewhat entred (as my leisure and occasions would serue, and at by times) partly by reading other mens writings, and partly by my owne industrie and practize: Wherby what I haue collected, and found, this little Treatise will shew. Which, whether it be any thing, or nothing, I do referre vnto the iudicious Readers consideration, but in speciall to your fauorable construction, and good acceptance.

Many yeeres since diuers of my good friends, and among them some honourable persons, were very desirous that I should publish such obseruations as I had collected, both before, and also after the setting forth of D. *Gilberts* booke: And none more earnest herein then D. *Gilbert* himselfe, vnto whom I communicated what I had obserued of my selfe, and what I had built vpon his foundation of the *Magnetisme* of the earth. Both which hee liked well and wished me to publish them, as I remember at the time of our priuate conference, as may further appeare by letters that I received from him; which I haue to shew vnder his owne hand.

But

CATALOGUE OF WHEELER GIFT

Als mede een klare beschrijving van de Quinta Essentia. Second edition. 115 pp. 12mo. Rotterdam, Adriaan van Dijk.  
Rotterdam, 1701

—See also 104.

96.† **Branca, Giovanni.** (1571-?) . Le machine, volume nuovo et di molto artificio da fare effetti maravigliosi tanto spiritali quanto di animale operatione arichito di bellissime figure con le dichiarationi a ciascuna di esse in lingua volgare et latina. 3+40+14+23 l. ill. 4to. Roma, J. Mascardi.

Rome, 1629

Collection of 63 curious engravings, 23 of which refer to hydraulic appliances and 40 to machines for various uses; contains the first suggestion of the modern steam turbine; brief descriptions in Italian and Latin.

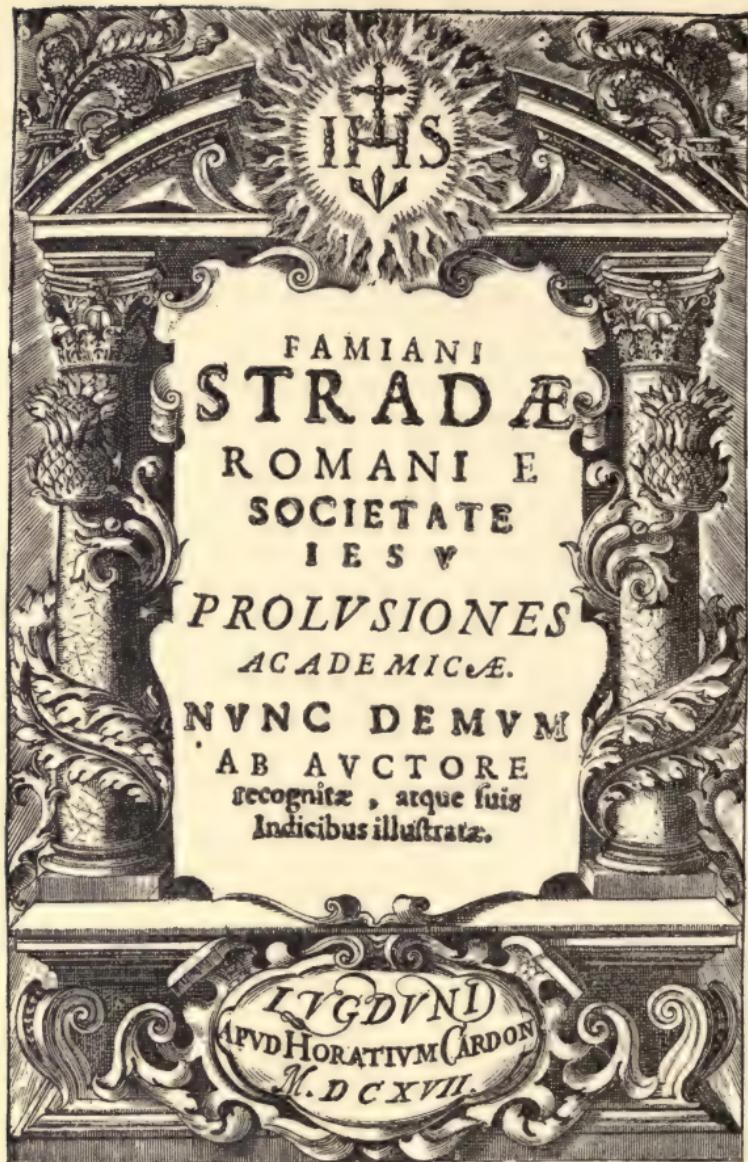
97. **Cabeo, Nicolo.** (1585-1650.) Philosophia magnetica, in qua magnetis natura penitus explicatur et omnium quae hoc lapide cernuntur, causae propriae afferuntur, nova etiam pyxis construitur, quae propriam poli elevationem, cum suo meridiano, ubique demonstrat, multa quoque dicuntur de electricis et aliis attractionibus et eorum causis, additis figuris variis tam aeneis quam ligno incisis. 9 l.+412 pp.+6 l. ill. Folio. Coloniae, apud J. Kinckium. Cologne, 1629

On p. 194 of this famous work of the great Italian Jesuit will be found the first recognition of electrical repulsion. Gilbert's discoveries and theories are freely discussed, the latter often adversely. Sympathetic telegraphy disproved, p. 301; magnetic field mapped out by iron filings; also diagrams of the magnetic (lover's) telegraph. Cabeo (Cabaeus) opposed the views of Copernicus on astronomy as well as those of Gilbert on terrestrial magnetism. Copies of this first edition, (which was also published with a *Ferrara* imprint), are much sought after. (See No. 1711.)

98. **Panciroli, Guido.** (1523-1599.) Guidonis Pancirolli Rerum memorabilium pars prior (et posterior). Vol. i. Guidonis Pancirolli Rerum memorabilium sive deperditarum pars prior commentariis illustrata, et locis prope innumeris postremum aucta ab Henrico Salmuth. Vol. ii. Guidonis Pancirolli jc. clarissimi Nova reperta sive rerum memorabilium recens inventarum pars posterior. 6 l.+349 pp.+11 l.+4 l.+313 pp.+8 l. 4to. Francofurti, sumptibus Godefridi Tampachij. Frankfort, (1629)-1631

Work of the Italian jurist and antiquary on ancient arts and inventions. Vol. i. reference on p. 121 to amber as tears shed by trees and often enclosing insects. Vol. ii. the mariner's compass, p. 232; the sympathetic compasses, p. 237. The first Latin edition translated from the Italian by Salmuth was published 1599-1602.

99. **Hakewill, George.** (1579-1640.) An Apologie or Declaration of the power and providence of God in the government of the world. The second edition, revised, and augmented; with advertisements and tables newly annexed in the end of the



90. STRADA. (Reduced.)

CATALOGUE OF WHEELER GIFT

Book, and a frontispiece by Cecill. 20 l.+523 pp.+34 l. Folio. Oxford, William Turner.

*Oxford, 1630*

The mariner's compass, p. 281; the Latin text and metrical translation of Strada's famous poem on sympathetic compasses, p. 286. (See No. 90.) Hakewill was Doctor of Divinity and Archdeacon of Surrey. (See No. 3857.)

100. **Longinus, Caesar.** (— — .) *Trinum magicum, sive Secretorum magicorum opus. I. De Magia Naturali, artificiosa et superstitionis disquisitiones axiomaticae. II. Theatrum Naturae praeter curam magneticam et veterum sophorum sigilla et imagines magicas, etiam conclusiones physicas, elementales, coelestes et infernales exhibens. III. Oracula Zoroastris et mysteria mysticae philosophiae Hebraeorum, Chaldaeorum, Aegyptiorum, Persarum, Orphicorum, etc., et Pythagoricorum. Accessere nonnulla secreta secretorum et mirabilia mundi, et Tractatus de proprii cuiusque nati daemonis inquisitione.* 12 l.+498 pp.+2 l. 16mo. Francofurti, sumptibus Conradi Elfridi. *Frankfort, 1630*  
Unimportant references to the lodestone, pp. 181-244.

101. **Mydorge, Claude.** (1585-1647.) *Examen du livre des récréations mathématiques et de ses problèmes en géométrie, mécanique, optique, et catoptrique. Où sont aussi discutées et restablies plusieurs expériences physiques y proposées.* (Notes par D(enis) H(enrion).) 8 l.+280+106 pp.+6 l. +39 pp. ill. 12mo. Paris, Robert Boutonne. *Paris, 1630*  
This is the *Mathematical Recreations* of Van Etten (Jean Leurechon) to each problem of which the author adds remarks of his own. The sympathetic telegraph, pp. 140, 144; method of finding magnetic variation; the illustrations are numerous and ingenious.

—See also 93.

102. **Kircher, Athanasius.** (1601-1680.) *Ars magnesia hoc est disquisitio bipartita empirica seu experimentalis physico-mathematica de natura, viribus et prodigiosis effectibus magnetis quam Cum theorematice, tum problematicè propositam, nouâque methodo ac apodictica seu demonstratiuâ traditam, variisque usibus ac diuturnâ experientiâ comprobatam faente Deo, tuebitur D. Joan-Jac. Sweigkhardus a Freihausen; praeside et authore Athanasio Kircher.* 4 l.+63 pp., ill. Sm. 4to. Heripoli, typis Eliae Michaelis Zwick. *Wurzburg, 1631*

This smaller and very rare work of the celebrated German Jesuit contains remarks on Porta's sympathetic magnetic telegraph, p. 35; Strada's poem on sympathetic compasses, p. 36 (see No. 90); magnetic games and paradoxes, p. 54; superstitious magnetic practices, p. 58.

—See also 116, 158, 159, 169, 191, 247.

103. **Lehman, Abraham.** (— — .) *Keraunologia sive fulminum theoria meteorologica.* 7 l. Sm. 4to. Witteberge, Christiani Tham. *Wittenberg, 1631*  
Thesis on lightning and thunder: thunder-stones, bell-ringing during electric storms, etc.

LIBERTI FROMONDI  
S. TH. L.

Collegij Falconis in Academia Louaniensi .  
Philosophiae Professoris Primarij

METEOROLOGICORVM

LIBRI SEX.



ANTVERPIÆ,  
EX OFFICINA PLANTINIANA,  
Apud Balthasarem Moretum, & Viduam  
Ioannis Moreti, & Io. Meursium.

M. DC. XXVII.

94. *FROMONDUS.* (*Reduced.*)

CATALOGUE OF WHEELER GIFT

104. **Valentinus**, Bazilius. (Fifteenth Century.) *Conclusiones ofte Sluytredonen aller siiner Schriften ende Tractaten van Swavel Vitriol ende Magneet.* Haer by geboecht is een Tractaet van de Nature der vier elementen door Cornelis Drebbel. 111 pp., ill. Rotterdam, Jan van Waesberge. *Rotterdam, 1632*  
 Reference to the lodestone, pp. 34, 38; lightning and thunder, p. 83. Basil Valentine, a Benedictine monk, is often spoken of as the last of the alchemists and the first of the chemists.  
 —See also 95.

105. **Oddi**, Muzio. (1569-1631.) *Fabrica ed uso del compasso polimetro.* 3 l.+124 pp., ill. Sm. 4to. Milano, appresso Francesco Fobella. *Milan, 1633*  
 The compass referred to is the instrument used in drawing.

106†. **Liceti**, Fortunio. (1577-1657.) *Pyronarcha sive de Fulminum natura deque Februm origine, libri duo.* 4 l.+126 pp.+6 1. 2 plates. Sm. 4to. Patavii. *Padua, 1634*  
 Tract on lightning and thunder, consisting mainly of quotations from classical writers.

107. **Stevin**, Simon. (1548-1620.) *Les oeuvres mathématiques, où sont insérés les mémoires mathématiques esquels s'est exercé le tres-haut et tres-illustre Prince d'Aurenge, Gouverneur des Provinces des Pays-bas, etc. Le tout reveu, corrigé et augmenté per Albert Girard, Samiélois, mathématicien.* 4 l.+224 pp.+678 l. ill. Folio. Leyde, Bon. et Abr. Elsevier. *Leyden, 1634*  
 Stevin was an eminent Flemish engineer and mathematician. This volume of his collected works contains his celebrated treatises on statics and hydrostatics, as well as his great tract on "The method of finding ports" by means of the compass, p. 169. Gilbert (*De Magnete*, Book iv., chap. 9), (see No. 72), criticizes a statement made on p. 173 about the line of no variation, and approves a method invented by Stevin, p. 673, for making ports on long voyages by an accurate knowledge of the variation. Instruments for determining this variation at sea are described by Stevin on pp. 174, 175.  
 —See also 70 bis.

108. **Galilei**, Galileo. (1564-1642.) *Systema cosmicum, in quo quatuor dialogis de Duobus maximis mundi systematibus, Ptolemaico et Copernicano, rationibus utrinque propositis indefinite ac solide disseritur. Accessit tractatus de motu ex Italica lingua Latine conversum, (M. Berneggerus), accessit appendix gemina, qua SS Scripturae dicta cum terrae mobilitate conciliantur.* 81.+495 pp.+12 l., portr. 4to. Augustae Treboc, empensis Elzeviriorum. *Strasburg, 1635*  
 This *System of the Universe* is one of Galileo's famous works. Discredits sympathetic magnetic telegraphy, p. 88; defends Gilbert's theory that the earth is a great magnet, p. 393; experiments with armed lodestones, p. 398; why their lifting power is increased when armed, p. 400.  
 —See also 127.

& qualibet obnubilatione impedita effluuiū, impeditur attractio. Tertio quia non trahit vlo modo, si tegatur, aut quidlibet interponatur, quod effluuium possit impeditre.

Quod autem effluutum illud sic trahat commouēdo aerem, & aer in gyrum actus rapiat corpuscula modo explicato, suadetur mihi. Primo, quia si sit electrum planū, quod preparetur in facie aliqua plana, & bene tergatur tota illa facies, deinde applicetur ad trahendum super plano corpuscula præparata facies, versorium, & corpuscula non confluent ad medium, sed ad omnes extremitates circum quaque, & ferè semper paleæ, & corpuscula longiora, si applicant vnauti extremitatem ad marginem aliquam, alteram extremitatem non vertent versus medium, sed ad aliæ partes: ergo signum est aerem commotum ex plano reuerti quasi in gyrum ad margines, & secum rapere corpuscula, vt dicebam. Neque est necesse, vt in ista commotione, & gyro aeris intercedat multum temporis, quod obijciebat Gilbertus. Secundo si bene præparetur facies electri, deinde applicetur ad trahendum ferri ramenta, aut ligni, vel similia corpuscula aliqua, ita vehementer accurent ad electrum, vt, dum ad illud perueniunt, resiliant, & non decidunt recta deorsum, sed repellantur procul ad distantiam trium, aut quatuor digitorum: ergo signum est motum illum corpusculorum esse ex commotione aëris, quæ oritur ex effluvio illo, à quo etiam projiciuntur procul illa corpuscula. si enim esset appulsus corpusculorum, vt loquitur Gilbertus, in qualibet effluuijs prope electrum, resilirent impellente impetu ad electrum, nec projicerentur, sicuti, quia sic trahit magnes, quantum vis trahat impetu nunquam resilit ferrum, nec repellitur perueniens ad magnetem: hic vero cum appulsum corpus, resiliat etiam, signum est morueri ab externo impellente, nimirum ab aere.

Tertio non semel, neque iterum, sed sæpe, quod dicam, sum expertus præparauit faciem electri, & applicauit ad trahendam ligni scobem seu limatum, ita autem adhærebant lignæ particulae, vt efformarent quosdam velutini pilos. Observauit autem semper ferè extremitates illorum pilorum fluctuare, nutare, & subinde non tam decidebant extremitates illorum pilorum quam projiciebantur procul, vt manifesto obseruaui alijs etiam spectantibus; post aliqualem enim nutationem videbamus aliquas ligni particulas projici: ergo signum est expirare effluuium, quo propellitur aer, & si corpora adelectum accurrunt, est quia reuertens aer secum illa defert. Quod si dicas cum Gilberto, si fieret ista aeris commotio bene præparato electro, & ad candelæ flamulam applicato, commoueretur illa flamula, quæ quolibet leui flatu agitatur. Respondeo hoc prouenire ex eo quod flamma effluuium illud electricum discipat, & alio auertit sua vi, & directione seu ascensu; nec permittit; vt aerem in gyrum agat. Vnde non solum flammat non trahit electrum, sed nec permebitiam flammat ad se trahit aliud. Si addas, quomodo potest ex chrystral-

CATALOGUE OF WHEELER GIFT

109. **Gellibrand, Henry.** (1597-1636.) A discourse mathematical on the variation of the magnetical needle, together with its admirable diminution lately discovered. 1 l.+22 pp., ill. Sm. 4to. London, William Jones. *London, 1635*

This very scarce tract of 22 pages is of historic interest, being a record of Gellibrand's discovery in 1634 of the *secular* change in magnetic "Variation." It is here deduced from the observations of Borough and Norman in 1580, of Gunter in 1622 and his own in 1634. Gilbert held that the declination, though varying from place to place, is constant at any given place. The *daily* change was detected by George Graham in 1722 and the *annual* by Cassini between 1782 and 1791. Henry Gellibrand and Edmund Gunter (inventor of scale) were Professors of Mathematics in Gresham College, London.

109a.——Facsimile edition. 7+22 pp., 4to. (Half-title:) Neudrucke von Schriften und Karten ueber Meteorologie und Erdmagnetismus (hrsg. von G. Hellmann) No. 9. Berlin, A. Asher & Co. *Berlin, 1897*

—See also 284.

110. **De L'Isle, Le Sieur, pseud.** (i.e. Chas. Sorel) (1599-1674.) Des talismans; ou figures faites sous certaines constellations, pour faire aymer et respecter les hommes, les enrichir, guérir leurs maladies, etc., avec des observations contre le livre des Cvriositez inoyves de M. I. Gaffarel; et un traicté de l'unguent des armes ou vnguent sympathétique et constellé. Le tout tiré de la seconde partie de la Science des choses corporelles. Par le Sieur de L'Isle. 4 l.+417 pp.+1 l. 12mo. Paris, Anthoine de Sommaville. *Paris, 1636*

Work on astrology; magnetic ointment, p. 341; action of iron on the magnet, the magnet on the pole, the heliotrope on the sun and wine on the vine, p. 350.

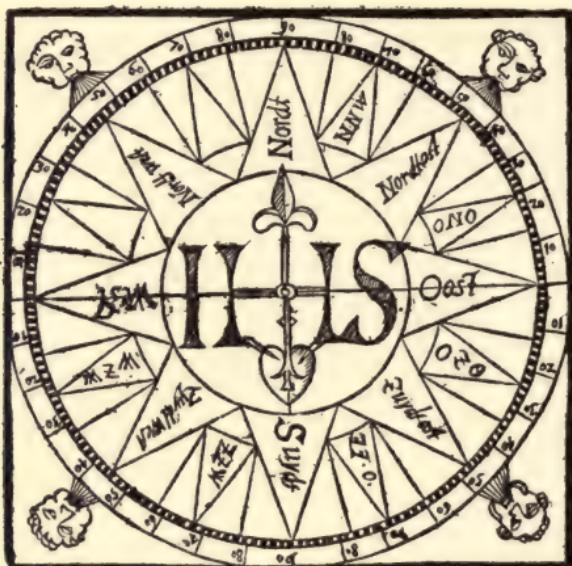
110bis. **Schwenter, Daniel.** (1585-1636.) Deliciae physico-mathematicae oder Mathematische und Philosophische Erquickungsstunden, darinnen sechshundert drey und sechzig schoene, liebliche und annehmliche Kunststuecklein, Auffgaben und Fragen auss der Rechenkunst, Landtmessen, Perspectiv, Naturkuendigung und andern Wissenschaften genommen, begriffen sind. 574 pp. Nuernberg, Jer. Duemlers. 1636.—Deliciae mathematicae et physicae. Der mathematischen und philosophischen Erquickungsstunden zweyter Theil: bestehend in fuenfhundert nutzlichen und lustigen Kunstfragen, nachsinnigen Aufgaben und seroselben grundrichtigen Erklaerungen, aus Athanasio Kirchero, Petro Bettino, Marino Mersennio, Renato des Cartes, Orontio Fineo, Marino Gethaldo, Cornelio Drebbelio, Alexandro Tassoni, Santorio Sanctorii, Marco Marci, und vielen andern Mathematicis und Physicis zusammen getragen durch Georg Philipp Harsdoerffern. 620 pp. Nürnberg, Jer. Duemlern. 1677.—Deliciae philosophiae et mathematicae: Dritter Theil, bestehend in fuenfhundert



## EPIGR A M M A

*Ad Lectorem.*

**C**ur Magno, minimas, minimum Magneta dicātima  
Fors multis mirum est; vnicā causa fuit.  
Magnus enim magnes, melius magneta minorem.  
Attrahit, & melius ferrā minora mouet.  
Prīnceps est magnes, magnes magneta trahebat.  
Nexu ita Sympathico iunctus vterque fuit.



## A L I V D.

*De acu Magnetica.*

**C**œlum, nosse cupis, mare, terras? Inspice; cuncta hac  
En tibi clausa suâ pyxide monstrat acus.

CATALOGUE OF WHEELER GIFT

Fragen. 660 pp. Nürnberg, Wolfgang der Juengere. 1692.  
4to.

*Nuremberg, 1636-1692.*

These three volumes of recreative science are a storehouse of the physical knowledge of the age. Vol. I, p. 347, repeats the idea of the lover's magnetic telegraph in which the author places no belief; part 8 treats of the magnet. The armature strengthens the magnet, vol. ii, p. 328; perpetual motion produced by magnets discredited, vol. ii, p. 404; magnetic clock, vol. ii, p. 466, being the first instance of such a piece of mechanism; vol. iii, p. 343; bell rung by what may be called the armature of a magnet.

—See also 73.

111. (Ward, Samuel.) (1617-1689.) Magnetis reductorium theologicum tropologicum in quo ejus novus verus et supremus usus indicatur. 16 l.+162 pp. 1 plate, 16mo. London, impensis A. M. *London, 1637*

The author gives a spiritual interpretation to the various properties of the magnet. The illustrations opposite the title-page are interesting. Strada's poem is given, p. 150, followed by another, on the *golden magnet* which is said to attract not iron but gold. (See No. 90.)

111a.——(English Translation.) The Wonders of the Loadstone, or the Loadstone newly reduc't into a divine and morall use. (Translated from the Latin, by Sir H. Grimston.) 12 l.+281 pp. 12mo. London, P. Cole. *London, 1640*

112. Fludd, Rob(ert.) (Robertus de Fluctibus.) (1574-1637.) Philosophia Moysaica, in qua sapientia et scientia creationis et creaturarum explicantur. 5 l.+152 l., ill., 1 pl. Folio. Goudae, excudebat Petrus Rommazenius. *Gouda, 1638*

Aristotle's views on lightning and thunder refuted, l. 54; lengthy treatise on magnetism based on Gilbert, l. 97-152; curative properties of the lodestone. This work contains one of the earliest notices of the *thermometer*; Galileo's dates back to 1595. The author was an ardent Rosicrucian. An English translation appeared in 1659.

113.——Responsum ad hoploclismaspongum M. Fosteri presbiteri, ab ipso, ad unguenti armarii validitatem delendam ordinatum, hoc est, spongiae M. Fosteri expressio seu elisio. 30+1 l. Folio. Goudae, excudebat Petrus Rommazenius. *Gouda, 1638*

An answer to a clergyman in defense of the use of certain unguents. (See No. 152.)

114. Tarde, Jean. (— — —) Les usages du quadrant à l'esguille aymantée, divisé en deux livres. 61.+118 pp., ill. Sm. 4to. Paris, Jean Gosselin. *Paris, 1638*

Treatise on the use of the compass on land and sea. The declination is given for Sarlac, p. 17, and for Lyons, p. 19. Needles suspended on pivots and in *stirrups*, p. 28.

115. Bacon, Francis. (Baron Verulam.) (1561-1626.) Of the advancement and proficience of learning, or, The partitions of sciences, written in Latin, interpreted by Gilbert Wats. 20 l.+60 pp.+7 l.+477 pp.+11 l., portr. Sm. Folio. Oxford, for R. Young. *Oxford, 1640*

The first edition of this translation of Bacon's celebrated work appeared during his lifetime. Book iii., chap. iv., contains the author's division of



108. GALILEI. (Reduced.)

## CATALOGUE OF WHEELER GIFT

the sciences into Physics and Metaphysics. His depreciation of mathematics and denial of the earth's rotation will be found on p. 146. Gilbert is mentioned but not lauded, pp. 115, 161.

116. **Kircher, Athanasius.** (1602-1680.) *Magnes sive de arte magnetica opus tripartitum.* Quo praeterquam quod universa Magnetis Natura, eiusque in omnibus Artibus et Scientijs usus nova methodo explicetur, è viribus quoque et prodigiosis effectibus Magneticarum, aliarumque abditarum Naturae motionum in Elementis, Lapidibus, Plantis et Animalibus elucescentium, multa hucusque incognita Naturae arcana per Physica, Medica, Chymica, et Mathematica omnis generis experimenta recluduntur. Sumptibus Hermanni Scheus sub signo Reginae. 25 l.+916 pp.+9 l. ill. 31 plates. 4to. Romae, ex typographia Ludovici Grignani. *Rome, 1641*  
In this first and rare edition of Kircher's celebrated work, the learned Jesuit deals with electrics as well as magnetics, showing great versatility and encyclopaedic knowledge. He controverts Gilbert's theories in magnetism and those of Kepler in astronomy. He was a decided anti-Copernican. The noun *magnetism* occurs frequently (first used by Barlow in 1616, see No. 89), while the compound *electro-magnetism* is the astonishing title of a chapter beginning p. 640. The work contains many original experiments and demonstrations.

116a.——Third edition: *Magnes sive de arte Magnetica Opus tripartitum quo Universa Magnetis Natura, eiusque in omnibus Scientijs et artibus usus, nova methodo explicatur; ac praeterea e viribus et prodigiosis effectibus Magneticarum, aliarumque abditarum Naturae motionum in Elementis, Lapidibus, Plantis, Animalibus elucescentium, multa hucusque incognita Naturae per Physica, Medica, Chymica, et Mathematica omnis generis Experimenta recluduntur.* Editio tertia. Ab ipso Authore recognita, emendataque, ac multis novorum Experimentorum problematis aucta. 16 l.+618 pp.+14 l. ill. Folio. Romae, sumptibus Blasij Deversin et Zanobij Masotti Bibliopolarum. *Rome, 1654*

The second edition was published in Cologne in 1643, and the last revised edition in Rome, 1654.

—See also 102.

117. **Wilkins, John.** (1614-1672.) *Mercury, or The secret and swift messenger, shewing, how a man may with privacy and speed communicate his thoughts to a friend at any distance.* 7 l.+180 pp., ill. 12mo. London, for John Maynard. *London, 1641*  
The author of this ingenious work refers, p. 147, to the directive, magnetic action of the earth; to induction through thick masses; and to the magnetic field. The supposed simultaneous operation of sympathetic magnets, p. 146; the efficacy of pipes and tubes for the transmission of sound, p. 133; and a description of a *phonograph* from which "the words shall come out distinctly and in the same order wherein they were spoken," p. 134.

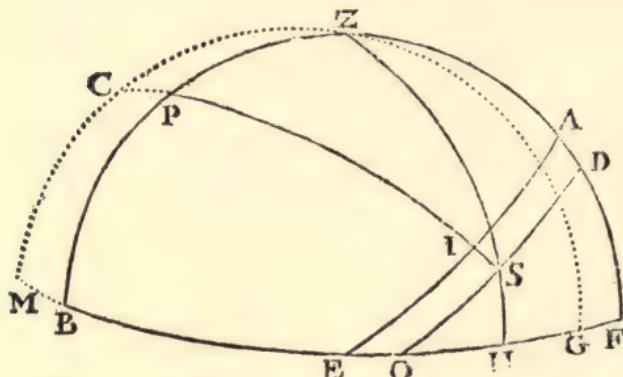
117a.——Second edition. 7 l.+172 pp.+2 l. 12mo. London, for Rich. Baldwin. *London, 1694*

—See also 126.

A  
DISCOVRSE  
MATHEMATICAL  
ON THE VARIATI-  
ON OF THE MAGNETICALL  
Needle.

# Together with Its admirable Diminution lately discovered.

By *Henry Gellibrand* Professor of Astronomie  
in Gresham College.



*Veniet tempus, quo ista que nunc latent, in lucem dies extrahat, et longioris avi diligentia. Sen. Nat: Quæst. lib. 7. cap. 25.*

London,  
Printed by William Jones, dwelling in  
Red-crosse-Street. 1635.

109. GELLIBRAND. (Reduced.)

CATALOGUE OF WHEELER GIFT

118. **Descartes**, René. (du Perron.) (Renatus Cartesius.) (1596-1650.) *Epistola ad celeberrimum virum D. Gisbertum Voetium. In qua examinantur duo libri, nuper pro Voetio Ultrajecti simul editi, unus de Confraternitate Mariana, alter de Philosophia Cartesiana.* 88 pp. 4to. (Amsteldami, L. Elzevir.)  
*Amsterdam, 1643*  
In this letter, Descartes critically reviews two philosophical works written by Voet, the Dutch scholar and theologian.  
—See also 128, 138, 149, 160.

119. **Goclenius**, Rodolphus. (the younger.) (1572-1621.) *Mirabilium naturae liber, concordias et repugnantias rerum in plantis, animalibus, animaliumque morbis et partibus, manifestans, nunc primo in lucem datus. Adjecta est nova defensio magneticae curationis vulnerum.* 8 l.+303 pp., 12mo. Francofurti, apud J. D. Zunnerum.  
*Frankfort, 1643*  
Magnetic and electrical matters, pp. 175-209. The author, Professor of physics in Marburg, was a follower of Gilbert. (See Nos. 85, 113, 130, 152.)  
—See also 85.

120. **Boodt**, Anselm Boetius de. (1550-1632.) *Le parfaict joaillier, ou, Histoire des pierreries, où elles sont amplement descriptes composé par Boece de Boot et de nouveau enrichi de belles annotations, indices et figures per André Toll.* (Traduit du Latin par Jean Bachow). 161.+746 pp.+181, ill. 12mo. Lyon, J. A. Huguetoan.  
*Lyons, 1644*  
The first edition of this celebrated work of the Dutch mineralogist on gems and minerals was written in Latin and published in 1609. The lodestone and properties, pp. 564-612. The author disproves, p. 599, the possibility of two persons communicating with each other at a distance by means of a sympathetic, magnetic telegraph.

120a.——*Gemmarum et lapidum historia, quam olim edidit Anselmus Boetius de Boot, postea Adr. Tollius recensuit et commentariis illustravit. Tertia editio, cui accedunt Joannis de Laet De gemmis et lapidibus libri duo et Theophrasti liber de lapidibus, Graece et Latine.* 4 l.+576 pp.+12+32 l.+210 pp.+3 l., ill. tabl. 12mo. Lugduni Batavorum, Joannis Maire.  
*Leyden, 1647*  
The properties and uses of the lodestone and magnet are described, pp. 438-475; declination, p. 453. Latin translation of No. 120.  
—See also 331.

121. **Blaeu**, Guillaume. (1571-1638.) *Le théâtre du monde; ou, Nouvel atlas contenant les cartes et descriptions de tous les pais de la terre.* 3 volumes (complete in 4). Large folio. Amsterdami, apud Johannem Guiljelmi F. Blaeu.  
*Amsterdam, 1645*  
Translation of the extensive work of the Dutch geographer and typographer on the origin, history, civilization, industries and trade of the various countries of the world with numerous maps—political, historical and topographical.



110bis. SCHWENTER.



Qvod Teiso, Aysonius, qvod Graius, Hebreus, Arabsq,  
 Qvod Syrus, Aysrius sicutur, multi: unius omne  
 SCHWENTERI à lingua manat. Quid, qvòd docet artem  
 Euclidis; tum quæ mysteria docta mathesis.  
 Suggerit. HVNC spectandum obfert heic Cous Apelles.

G. Rem. P. 150

110bis. SCHWENTER. Portrait. (See No. 4377.)



FLUDDVS hic ille est. quo gaudet terra Britannia.  
Quig[ue] Machaoniam clarus in arte micat

D.P.

112. FLUDD. (See No. 4377.)

CATALOGUE OF WHEELER GIFT

122. **Grandamicus, Jacobus.** (1588-1672.) *Nova demonstratio immobilitatis terrae petita ex virtute magnetica. Et quaedam alia ad effectus et leges magneticas, usumq., longitudinum et universam geographiam spectantia, de novo inventa.* 4 l.+170 pp., ill., 9 plates. Sm. 4to. *Flexiae, apud Georgium Griveau. La Flèche, 1645*  
The object of this work may be gathered from the following syllogism: No magnetic body rotates around its poles; the earth possesses magnetic properties as shown by Gilbert, therefore it does not turn around its poles—a denial of the rotation of the earth. The author held strong anti-Copernican views. The engravings are numerous and interesting.

123. **Browne (Sir) Thomas.** (1605-1682.) *Pseudodoxia epidemica; or, Enquiries into very many received tenets and commonly presumed truths.* 10 l.+286 pp. Folio. London, for Edward Dod. *London, 1646*  
The author concludes from his own experiments that communication at a distance by means of sympathetic needles is impossible. He also writes down such illusions and fables as the flesh magnet, p. 67; the garlic anti-magnetic effluvium, p. 67; suspension of Mahomet's coffin, p. 71. Gilbert's views are everywhere upheld. On p. 51 occurs for the first time in English the term *electricity*, and on p. 79 the plural form, *electricities*. Sir Thomas Browne was the author of *Religio Medici*.

124. **Regius, Henricus.** (Le Roy.) (1598-1679.) *Fundamenta physices.* 8 l.+306 pp.+1 l., ill. Sm. 4to. *Amstelodami, apud Ludovicum Elzevirium. Amsterdam, 1646*  
Treatise on general physics and physiology, with 15 pages on the magnet. Numerous magnetic diagrams from Descartes.  
—See also 139.

125. **Laet, J(an) de.** (1593-1640.) *De gemmis et lapidibus libri duo, quibus praemittitur Theophrasti liber de lapidibus, Graece et Latine.* 32 l.+210 pp., ill., 12mo. *Lugduni Batavorum, ex officina Joannis Maire. Leyden, 1647*  
Work on gems and minerals; no reference to the lodestone.  
—See also 331.

126. **Wilkins, John.** (1614-1672.) *Mathematicall magick; or, The wonders that may be performed by mechanicall geometry.* In two books. Concerning mechanical powers, motions, Being one of the most easie, pleasant, useful, and yet most neglected part of mathematicks. Not before treated of in this language, by J. W. 7 l.+295 pp., ill. 12mo. London, by M. F., for Sa. Gellibrand. *London, 1648*  
Chap. xiii. of this work on mechanical contrivances deals with attempts made to obtain perpetual motion by means of magnets. The efforts of Peregrinus and Cardan to solve the problem are mentioned and the opinion of Gilbert given, *viz.* that it is "a vain and groundless fancy," p. 258. Wilkins, Bishop of Chester, was one of the founders of the Royal Society, of which he was the first secretary.

gitur, & ita mira quadam vicissitudine vnum alterum conferuat; vnde ordigne prepostero, vt supra demonstratum est, de-nuò transmutantur, & ex se inuicem fiunt, facilis enim est transitus, postquam communem naecta sunt qualitatem, vt ignis & aér per calorem; his autem opposita difficulter vertuntur. Atque ex his suppono secundò. Ex calido & frigido oriri rarefactionem & condensationem, ex quibus omnium elementarium motiones promanare supra diximus, vt cum calidum in mistum aliquod agens educit impurum, & dum suę actioni idoneum reddere tentat, vt simplicius fiat, euadit tenue; ita frigidum conseruat, constringit, & congelat, vnde calidum misti humorem ex centro elicit ad circumferentiam, frigidum verò eundem ex circumferentia ad centrum retrahit; ex quibus quidem qualitariis perpetuus in aëre motus causatur. Vapidum enim rarefactum, calore fugat frigidum circumstas: remisso vero calore frigidum constrictum locum suum repetit, & consequenter secum consistentia corpuscula denehit. Atque hac ratione omnia electrica trahere iam tempus est, vt declaramus.

## C A P V T III.

Ηλεκτρο-μαγνητεμδς.

idest

*De Magnetismo electrici, seu electricis attractionibus earumque causis.*

**E**lectrum Græcis eò, quod ad se attritu priùs calefactum paleas attrahat, Ηλεκτρος, vnde & ηλεκτρη, seu raptor dicitur, Latinis Succimum à flavo succo ex quo coagulatur, Arabibus Karabeh, eo quod in sacrificijs offerri esset solitum, viilla sua attractiva, qua Magnetem emulatur, nullo non tempore, summæ fuit Philosophis admirationi, adeòq; in hunc diem durat, vt vix in natura rerum exoticus effectus sit, cuius ignorantiam causam per Magnetem, & succinum (quæ sunt commune ignorantia asylum, & sacra veluti anchora) non in patrocinio sibi adsciscant; Electrum igitur, seu succinum, aut vulgo Ambra dictum paleas trahit; & levissima quævis corpuscula, res

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126a.——Another edition. 7 l.+295 pp., ill. 12mo. London, by H. F., for Sa. Gellibrand. *London, 1680*  
Submarine navigation, chap. v, p. 178; use of compass in steering a *submarine* boat, p. 183.  
—See also 117.

127. **Galilei, Galileo.** (1564-1642.) *Le operazioni del compasso geometrico ed militare.* Ed. III. 4l.+80 pp., 1 plate. 4to. Padova, P. Frambotto. *Padua, 1649*  
The instrument here referred to is not the magnetic compass but a sort of Gunter's scale.  
—See also 108.

128. **Descartes, René.** (du Perron.) (Renatus Cartesius.) (1596-1650.) *Principia philosophiae.* (Part III. of *Opera Philosophica*. Editio secunda ab auctore cognita.) 21 l.+302 pp., ill. Sm. 4to. Amstelodami, apud Ludovicum Elzevirium. *Amsterdam, 1650*  
Parts iii. and iv. of this work on fundamental philosophy contain the author's views on the mechanism of the solar system together with his famous theory of vortices. (See No. 139.)

129.——*Specimina philosophiae seu dissertatio de methodo recte regendae rationis, et veritatis in scientiis investigandae dioptrice et meteora.* (Part IV of *Opera Philosophiae*. Editio secunda ab auctore cognita) Ex Gallico translata. 8 l.+316 pp., ill. Sm. 4to. Amstelodami, apud Ludovicum Elzevirium. *Amsterdam, 1650*  
The views of Descartes on magnetism will be found on p. 266, *et seq.*, illustrated by diagrams showing the continuity of magnetic particles through a lodestone with the particles in the field of force. These particles, screw-like in form, are in constant whirling motion. Reference will also be found to lightning and thunder; St. Elmo's fires; summer lightning; the ringing of bells and firing of guns during a thunderstorm.

129a.——*Discours de la méthode pour bien conduire sa raison, et chercher la vérité dans les sciences. Plus la dioptrique et les météores qui sont des essais de cette méthode.* 294 pp.+131. Sm. 4to. Paris, Henry le Gras. *Paris, 1658*  
The first edition appeared in 1637. Lightning and thunder, p. 236; St. Elmo's fires, a good omen, p. 239; thunder-clouds broken up by ringing bells and firing guns, p. 245.  
—See also 118.

130. **Helmont, Joh(ann) Bapt(ist) van.** (1577-1644.) A ternary of paradoxes, the magnetick cure of wounds, nativity of tartar in wine, image of God in man. Written originally by Joh. Bapt. Van Helmont, translated, illustrated, and amplified by W(alter) Charleton. 26 l.+147 pp. Sm. 4to. London, J. Flesher, for William Leo. *London, 1650*  
This quaint work of the renowned Dutch alchemist treats of supposed curative powers of the lodestone together with a few of its real properties. pp. 39-43. On p. 77 of this translation by Dr. Charleton the noun *electricity* occurs for the second time in the singular number; Sir Thomas Browne used the term both in the singular and plural in 1646 (See 123). The term

Fabul. 9.

Horne to discover the irruption of the enemy.

There is another experiment to this purpose mentioned by *Walchius*, who thinks it possible so to contrive a trunk or hollow pipe, that it shall preserve the voice entirely for certain houres or days; so that a man may send his *words* to a friend instead of his *writing*. There being always a certaine space of intermission; for the passage of the voice, betwixt its going into these cavities, and its comming out; hee conceives, that if both ends were seasonably stopped, whilst the sound was in the midst, it would continue there till it had some vent. *Huc tubo verba nostra insurremus,* & cum probe munitione tabellario committamus, &c. When the friend to whom it is sent, shall receive and open it, the words shall come out distinctly, and in the same order wherein they were spoken. From such a contrivance as this, (saith the same Authour) did *Albertus Magnus* make his Image, and Frier *Bacon*, his brazen Head, to utter certaine words.

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*hypnotick* occurs, p. 81. To van Helmont we are indebted for the term *gas*, "geist." (See Nos. 85, 113, 119, 141, 152.)

—See also 152.

131. **Gilbert**, William. (1544-1603.) *Guilielmi Gilberti Colcestrensis, medici regii, De mundo nostro sublunari philosophia nova. Opus posthumum, ab auctoris fratre collectum pridem et dispositum, nunc ex duobus MSS. codicibus editum, ex museo viri perillustris Guilielmi Boswelli Equitis aurati, etc., et oratoris apud Foederatos Belgas Angli.* 7 l.+316 pp.+2 l., 1 plate, ill. 4to. Amstelodami, apud Ludovicum Elzevirium.

*Amsterdam, 1651*

This work was published forty-eight years after Gilbert's death, having been edited by his brother, William Gilbert of Melford; or, as some say, by John Gruter, the great humanist and critic. Gilbert's aversion for the philosophy of Aristotle is well shown throughout.

—See also 72.

132. **Reael**, Laurens. (fl. 1650.) *Observationen of ondervindingen aen de magneetsteen en de magnetische kracht der aerde. Quibus adjunctae sunt celeberrimi Professoris D. Casparis Barlaei Causae et rationes observationum earundem magneticarum.* 8 l.+91 pp., ill. 12mo. t'Amsteldam, Lodowijck Spillebout.

*Amsterdam, 1651*

Collection of magnetic experiments made by the author. The earth as a great magnet, p. 20; polarity of the compass-needle, p. 48; distinction between magnetic and electric attraction, p. 77. The propositions are stated in Latin, the explanations are given in Dutch.

133\*. **Riccioli**, G(iovanni) B(attista). (1598-1671.) *Almagestum novum. Astronomiam veterem novamque continens observationibus aliorum, et propriis novisque theorematibus, problematibus, ac tabulis promotam in tres tomos distributam quorum argumentum sequens pagina explicabit.* Vol. I (complete in 3 parts), ill. Folio. Bononiae, ex typographia Haeredis Victorii Renatij. *Bologna, 1651*  
Voluminous work on astronomy in which the author, an Italian Jesuit, adduces reasons against the Copernican system.

134. **Ross**, Alexander. (1590-1654.) *Arcana Microscosmi; or, The hid secrets of man's body disclosed; first in an anatomical duel between Aristotle and Galen about the parts thereof, secondly by a discovery of the strange diseases, symptomes and accidents of man's body. With a refutation of Doctor Brown's vulgar errors and the ancient opinions vindicated.* 7 l.+292 pp. 24mo. London, Thomas Newcomb. *London, 1651*  
Reference to the mariner's compass, p. 274.

135. **Nicols**, Thomas. (fl. 1659.) *A lapidary; or, The history of precious stones with cautions for the undeceiving of all those that deal with precious stones.* 15 l.+239 pp. tab. Sm. 4to. Thomas Buck. *London, 1652*

Interesting matter about amber and jet, pp. 165-172; the lodestone, pp. 195-207. The work was reprinted in 1653 and 1659 with different title pages.

dosis, extracteth the magistery of wine, after foure moneths digestion in horsedunge, exposing it unto the extremity of cold, whereby the aqueous parts will freeze, but the Spirit retyre and be found uncongealed in the center.

Againe, the difference of their concretion is not without reason, collectible from their dissolution, which being many wayes performable in Ice, is not in the same manner effected in Crystall. Now the causes of liquation are contrary to those of concretion, and as the atoms and indivisible parcels are united, so are they in an opposite way disjoyned. That which is concreted by exsiccation or expression of humidity, will be resolved by humectation, as earth, dirt, and clay; that which is coagulated by a fiery siccity, will suffer colliquation from an aqueous humidity, as salt and sugar, which are easily dissoluble in water, but not without difficulty in oyle, and well rectified spirits of wine. That which is concreted by cold, will dissolve by a moist heat, if it consist of watery parts, as Gums, Arabick, Tragacanth, Ammoniac, and others, in an ayrie heat or oyle, as all resinous bodies, Turpentine, Pitch, and Frankincense; in both as gummy resinous bodies, Mastick, Camphire, and Storax; in neither, as neutrals and bodies anomalous hereto, as Bdelium, Myrrhe and others. Some by a violent dry heat, as mettalls, which although corrodible by waters, yet will they not suffer a liquation from the powerfulest heat, communicable unto that element. Some will dissolve by this heat although their ingredients be earthy, as glasse, whose materialls are fine sand, and the ashes of Chali or Fearne, and so will salt runne with fire, although it bee concreted by heat, and this way alone may bee effected a liquation in Crystall, but not without some difficulty; that is, calcination or reducing it by Arte, into a subtile powder, by which way and a vitreous commixture, glasses are sometime made hereof, and it becomes the chieft ground for artificiall and factitious gemmes; but the same way of solution is common also unto many stones, and not only Berylls and Cornelians, but flints and pebbles, are subiect unto fusion, and will runne like glasse in fire.

But Ice will dissolve in any way of heat, for it will dissolve with fire, it will colligate in water, or warme oyle; nor doth it only submit to an actuall heat, but not endure the potentiall calidit of many watters; for it will presently dissolve in *Aqua fortis*, sp. of vitrioll, salt or tartar, nor will it long continue its fixation in spirits of wine, as may be observed in Ice injected therein.

Againe, the concretion of Ice will not endure a dry attrition without liquation; for if it be rubbed long with a cloth it melteth, but Crystall will calefy unto electricity, that is a power to attract strawes or light bodies, and convert the needle freely placed; which is a declarement of very different parts, wherein wee shall not at present

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137. **Charleton, Walter.** (1619-1707.) *Physiologia Epicuro-Gassendo-Charltoniana; or, A fabrick of science natural, upon the hypothesis of atoms, Founded by Epicurus, Repaired by Petrus Gassendus, Augmented by Walter Charleton.* Part 1 (all published.) 475 pp., ill. Folio. London, Tho. Newcomb, for Thomas Heath. *London, 1654*  
Comprehensive inquiry into the nature of things. Electrical attraction, p. 345; the torpedo, p. 375; Grandamini criticized, p. 410; magnetic declination, p. 410; magnetic polarity, p. 411.

138. **Descartes, René.** (du Perron.) (Renatus Cartesius.) (1596-1650.) *Meditationes de prima philosophia, in quibus Dei existentia, et animae humanae a corpore distinctio, demonstrantur.* His adjunctae sunt variae objectiones doctorum virorum in istas de Deo et anima demonstrationes; cum responsionibus authoris. Cum appendice; *Epistola ad Gisbertum Voetium.* 6 l.+191+164+88 pp. Amstelodami, apud Ludovicum Elzevirium. *Amsterdam, 1654*  
Metaphysical work in which the author demonstrates the fundamental principles of religion and philosophy; first edition, 1641.  
—See also 118.

139. **Regius, Henricus.** (Le Roy.) (1598-1679.) *Philosophia naturalis.* Editio secunda, priore multo locupletior et emendatior. 22 l.+442 pp., ill. 4to. Amstelodami, apud Ludovicum Elzevirium. *Amsterdam, 1654*  
General properties of magnets with illustrations, pp. 206-221. The illustrations are noteworthy, particularly the one on p. 207, which shows the lines of force around the magnet as well as the lines of induction through it, cf. *Principia Philosophiae* of Descartes, 2nd edition, p. 266. (See No. 128.)  
—See also 124.

140. **Albertus Magnus.** (1205-1280.) *De secretis mulierum, item de virtutibus herbarum lapidum et animalium.* 358 pp.+7 l. 16mo. Amstelodami, apud Jodocum Janssonium. *Amsterdam, 1655*  
Work on herbs and animals; reference to one of the mythical properties of the lodestone, p. 144.  
—See also 3.

141. **Irvine, C(hristopher).** (1638-1685.) *Medicina magnetica, or, The rare and wonderful art of curing by sympathy laid open in aphorismes; proved in conclusions; and digested into an easy method, drawn from both; wherein the connexion of the causes and effects of these strange operations are more fully discovered than heretofore.* All cleared and confirmed by pithy reasons, true experiments, and pleasant relations; preserved and published as a masterpiece in this skill. 6 l.+110 pp., 12mo. Edinburgh, C. Higgins. *Edinburgh, 1656*  
Among subjects treated are: "A magical magnetisme out of the famous Van Helmont"; "The magical magnetisme of the tarantula"; "The magnetisme of the magnet." This last is an unimportant paragraph about the lodestone. (See No. 130.)

PHYSIOLOGIA  
Epicuro-Gassendo-Charltoniana:  
OR  
A FABRICK  
OF  
SCIENCE NATURAL.  
Upon the Hypothesis of  
A T O M S,

Founded *EPICURVS,*  
Repaired *by PETRVS GASSENDVS,*  
Augmented *WALTER CHARLETON,*

Dr. in Medicine, and Physician to the late  
*CHARLES,* Monarch of  
Great-Britain.

The FIRST PART.

Fernelius, in *præfat. ad lib. 2. de Abditis rerum Caussis.*  
*Atomos veteres jam ridemus, miramurq; in fabi quisquam persuaserit, Corpora quædam solida, atque individua, fortuita illa concursione, res magnitudine immensæ, varietate multitudinæq; infinitæ, omnemq; absolutissimum hanc Mundi ornatum efficeret. At certè, si Democratis mortem cum visa commutare posset, multò acribet bac, qua putamus Elementa, suo more ridere.*

LONDON,  
Printed by Tho: Newcomb, for Thomas Heath, and  
are to be sold at his shop in Russel-Street,  
near the Piazza of Covent-Garden.  
1654.

CATALOGUE OF WHEELER GIFT

142. **Schott, Gaspar.** (1608-1666.) *Mechanica hydraulico-pneumatica, qua praeterquam quod aequi elementi natura, proprietas, vis motrix, atque occultus cum aere conflictus, a primis fundamentis demonstratur: omnis quoque generis experimenta Hydraulico-pneumatica recludentur: et absoluta machinarum aqua et aere animandarum ratio ac methodus praescribitur Opus bipartitum.* Accessit experimentum novum magdeburgicum quo vaccuum alii stabilire, alii revertare conantur. 161.+488 pp.+81, ill., 58 pl. 4to. Heripoli, excudebat Henricus Pigrin. *Wurzburg, 1657*  
 Part i., p. 354, description of Kircher's magnetic device to show the hour of the day. Part ii., p. 444, contains the first printed account of von Guericke's air-pumps and some experiments made with it, showing the pressure of air (the half-title bears the date 1658). (See No. 170.)  
 —See also 150, 155bis, 159, 184, 190, 531.

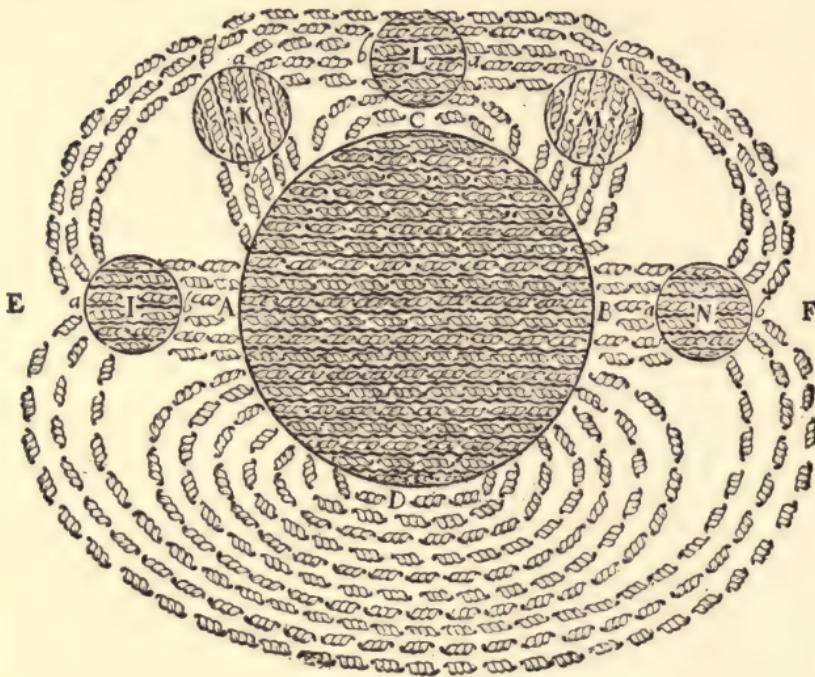
143. **Turner, Robert.** (fl. 1654-1665.) *An astrological catechisme wherein the art of judicial astrology is fully demonstrated by way of question and answer.* Written originally in Latin. Collected and Englished by R. Turner. pp. 141-168. 12mo. London, J. Cottrel. *London, 1657*  
 A series of questions on astrology with answers.

144.— *Ars notoria: the notory art of Solomon shewing the cabalistical key of magical operations, the liberal sciences, divine revelation, and the art of memory.* Whereunto is added: *An astrological catechism, etc.* (See No. 143.) 168 pp. 12mo. London, J. Cottrel. *London, 1657*  
 Bombastic work; sympathetic compasses and their uses, p. 136.

145. **Digby, (Sir) Kenelm.** (1603-1665.) *A late discourse made in a solemne assembly of nobles and learned men at Montpellier in France touching the cure of wounds by the powder of sympathy, with instructions how to make the said powder, whereby many other secrets of nature are unfolded.* Rendered out of French into English by R. White. 5 1.+152 pp. +1 l. 16mo. London, for R. Lowndes and T. Davis. *London, 1658*  
 The cure of wounds by the powder of sympathy has been ranked among the follies of science; p. 54 contains a reference to magnetic and electric attractions; p. 95, to acoustical resonance; p. 112, to ripples produced on the surface of water in a glass vessel when rubbed with the finger. (See No. 152.) A French edition was printed the same year as this first English edition.  
 —See also 156.

146. **Boyle, Robert.** (1627-1691.) *The sceptical chymist, or Chymico-Physical doubts and paradoxes touching the Stagyrist's principles commonly call'd hypostatical as they are wont to be propos'd and defended by the generality of Alchymists.* Whereunto is praemis'd part of another discourse relating to

quidem præterpropter, sed diversos tamen meatus, diversasque fibrillas tenuissimas in iis eminentes, & diversimodè inclinatas, atque ad figuram & transitum suum a-  
ptissimè conformatas, diutinâque morâ bene confirmatas, perpetuò injeniens, celerrimè per ejus substantiam fe-  
tatur: ipsum verò per poros circa A vel B egressa, quia



per aerem, aquam & reliquam Tellurem satis commodè moveri non potest, resilit, vorticemque utrumque in contrarium, ab australi parte, A, per C & D, versus borea-

139. REGIUS. (Reduced.)

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the same subject. 13 l.+436 pp., 12mo. London, J. Caldwell, for J. Crooke.

*London, 1661*

First edition, now very rare. In this work, Boyle seeks to subvert the accepted theory of matter. His atoms have different forms and sizes.

—See also 154, 163, 167, 172, 174, 178, 187, 203.

147. **Glanvill, Jos(eph).** (1636-1680.) The vanity of dogmatizing; or, Confidence in opinions, manifested in a discourse of the shortness and uncertainty of our knowledge and its causes. With some reflections on peripateticism, and an apology for philosophy. 16 l.+250 pp.+3 l., 12mo. London, for Henry Eversden.

*London, 1661*

Magnetic telegraphy possible, p. 203; magnetic cure of wounds, p. 207. Glanvill was an eminent divine and Fellow of the Royal Society.

147a.— —Scepsis Scientifica, or Confest ignorance, the way to science; in an essay of the vanity of dogmatizing, and confident opinion, with a reply to the exceptions of the learned Thomas Albius. 2 parts. 17 l.+184 pp.+8 l.+92 pp. Sm. 4to. London, Henry Eversden.

*London, 1665*

Extension of the author's "Vanity of Dogmatizing;" sympathetic magnetic telegraphy possible, p. 149. The second part has a separate title page, with an "i" under the "e" of *Scire*. (See No. 147b.)

147b.— —Scire tuum nihil est; or, The author's defence of the vanity of dogmatizing against the exceptions of the learned Tho. Albius in his late Sciri. 8 l.+92 pp. Sm. 4to. London, for Henry Eversden.

*London, 1665*

Critique of the philosophy of Aristotle.

148.\* **Conradi, Elias** (— — —) and **Joh. Christophorus Laurentius** (— — —). Ex physicis. De igne. 81. Sm. 4to. Witteberge, J. Haken.

*Wittenberg, 1662*

Pamphlet on fire as one of the elements.

149. **Descartes, René** (du Perron). (Renatus Cartesius.) (1596-1650.) De homine figuris et latinitate donatus a Florentio Schuyl. 18 l.+121 pp., 10 plates. 4to. Lugduni Batavorum, apud Fr. Moyardum & Petrum Leffen.

*Leyden, 1662*

A short treatise on physiology.

—See also 118.

150. **Schott, Gaspar.** (1608-1666.) Physica curiosa, sive mirabilia naturae et artis libri XII comprehensa, quibus pleraq; quae de angelis, daemonibus, hominibus, spectris, energumenis, monstris, portentis, animalibus, meteoris, etc., rara arcana, curiosaque circumferuntur, ad veritatis trutinam expenduntur, variis ex historia ac philosophia petitis disquisitionibus excutiuntur, et innumeris exemplis illustrantur. 31 l.+1583 pp.+15 l., pl. Sm. 4to. Heripoli, sumptibus Johannis Andreeae Endteri, per J. Hertz.

*Wurzburg, 1662*

Voluminous work of the distinguished German Jesuit on the wonders of animate nature and of physical phenomena. St. Elmo's fires occurring singly forebode *evil*, pp. 1428-1431; lightning and thunder, p. 1453; thunder-stone, p.



142. SCHOTT. (Reduced.)

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1467; trees liable to be struck by lightning, p. 1469; odor caused by lightning flash, p. 1457; rarity of electric storms in winter, p. 1456.

—See also 142.

151. **Westen, Wynant van.** (—.) *Mathematische vermaecklyckheden, te samen ghevoeght van verscheden ghenuchelijcke ende voertighe werkstucken.* 3 parts. (Deel I. by H. van Etten), ill. 12mo. Arnheim, Jacob van Briesen.

*Arnheim, 1662-1663*

The lodestone, p. 125; Mahomet's coffin, p. 127; sympathetic compasses, p. 128; attractive power of lodestone may be increased, p. 129 (parts 2 and 3 are dated 1662). (See No. 1711.)

—See also 93.

152. **Theatrum sympatheticum auctum, exhibens varios authores, de pulvere sympathetico quidem: Digbaeum, Straussinum, Papinium, et Mohy whole unguento vero armario: Goclenium, Robertum, Helmontium. Praemittitur his Sylvestri Rattrij aditus ad Sympathiam et anti-pathiam descriptionem simul exponens.** (Edited by A. Tentzel). 4 l.+722 pp.+21 l. 4to. Norimbergae, apud Johan. Andream Endterum.

*Nuremberg, 1662*

Collection of tracts by different authors on the *Weapon Salve* and the *Powder of Sympathy*. Frequent references to amber and the magnet; sympathetic compasses, p. 546. (See Nos. 113, 119, 130, 145.)

153. **Harvey, Gideon, (also Harvy.)** (1640 (?)-1700.) *Archelogia philosophica nova, or, New principles of philosophy containing Philosophy in general, Metaphysics, or Ontology; Dynamilogy, or A discourse of power; Religio philosophi, or Natural theology; Physicks, or Natural philosophy.* 25 l.+103 pp.+128 pp.+1 l.+441 pp., ill. Sm. 4to. London, for Samuel Thomson.

*London, 1663*

Properties of the magnet, the sailing compass, magnetic effluvium, pp. 240-260. The author was an eminent physician.

154. **Boyle, Robert.** (1627-1691.) *Some considerations touching the usefulness of experimental natural philosophy.* Second edition. (Edited by R. Sharrock), 2 vols. Sm. 4to. Oxford, for R. Davis.

*Oxford, 1664-1671*

Writers on magnetism, p. 15; magnetic phenomena, p. 226. Only Part i. belongs to the second edition; the first edition was published in 1663.

—See also 146.

155. **Power, Henry.** (1623-1668.) *Experimental philosophy, in three books containing new experiments—microscopical, mercurial, magnetical with some deductions, and probable hypotheses raised from them in avouchment and illustration of the now famous atomical hypothesis.* 12 l.+193 pp., ill., 2 plates. Sm. 4to. London, for John Martin & J. Allestry.

*London, 1664*

The author refutes, pp. 153-170, Grandami, who strove to prove the immobility of the earth by reason of its being a colossal globular magnet. (Each book has a separate title-page, dated 1663.)

## DOGMATIZING. 203

course is a reputed 'impossibility', but yet there are some hints in natural operations that give us probability that 'tis feasible, and may be compast without unwarrantable assistance from *Dæmoniack* correspondence. That a couple of *Needles* equally toucht by the same *magnet*, being set in two Dials exactly proportion'd to each other, and circumscribed by the Letters of the *Alphabet*, may effect this *magnale*, hath considerable authorities to avouch it. The manner of it is thus represented. Let the friends that would communicate take each a Dial: and having appointed a time for their *Sympathetick* conference; let one move his impregnate *Needle* to any letter in the *Alphabet*, and its affected fellow will precisely respect the same. So that would I know what my friend would acquaint me with; 'tis but observing the letters that are pointed at by my *Needle*, and in their order transcribing them from their *sympathized Index*, as its motion direct's: and I may be assured that my friend described the same with his: and that the words on my paper, are of his

147. *GLANVILL.*

CATALOGUE OF WHEELER GIFT

155<sup>†bis.</sup> Schott, Caspar. (1608-1666.) *Technica curiosa, sive mirabilia artis, libris xii.* 22 l.+1044 pp.+8 l., ill., portrait. Sm. 4to. Norimbergae, sumptibus Johannis Andreae Endteri & Wolfgangi junioris Haeredum. *Nuremberg, 1664*  
 The subjects treated are as follows: Guericke's Magdeburg experiments; Boyle's experiments; experiments of Torricelli and others with mercury vacua; hydro-pneumatic experiments; mechanical marvels; secret writing; problems in cyclometry; chronometers; perpetual motion; miscellaneous marvels; cabalistic writing. The portrait is that of John Philip, Archbishop of Mayence, to whom there is a poetical dedication. The end sheet gives a list to date of the works of this voluminous writer, which number thirteen, all published between 1657 and 1664.  
 —See also 142.

156. Digby, (Sir) Kenelm. (1603-1665.) Two treatises: in the one of which the nature of bodies; in the other, the nature of man's soule is looked into: in way of discovery of the immortality of reasonable soules. 24 l.+429 pp.+5 l.+145 pp. Sm. 4to. London, for John Williams. *London, 1665*  
 The artificial theories of Kenelm Digby, like those of Descartes, his friend, have long been abandoned. Odor emitted by electrical bodies, p. 216; Cabaeus criticised, p. 216; the lodestone, p. 218; induction due to earth, p. 242; variation of magnetic declination, p. 250. First treatise, preface dated 1644. Second treatise, title-page dated 1645. The first edition was printed in Paris, 1644; the second edition in London, 1658.  
 —See also 145.

157. Jonston, Joh(ann.) (1603-1675.) *Thaumatographia naturalis in decem classes distincta.* Editio altera. 495 pp.+3 l. 16mo. Amstelodami, apud Johannem Janssonium. *Amsterdam, 1665*  
 Work on natural wonders. Chap. xv. is devoted to the lodestone. The line of no magnetic declination is given on p. 150 as lying 10° west of the Fortunate Isles (the Canaries).

158. Kircher, Athanasius. (1601-1680.) *Magneticum Naturae regnum, sive disceptatio Physiologica De triplici in Natura rerum Magnete, juxta triplicem eiusdem Naturae gradum digesto Inanimato Animato Sensitivo Qua Occultae prodigiosarum quarundam motionum vires et proprietates, quae in triplici Naturae oeconomia nonnullis in corporibus noviter detectis obseruantur, in apertam lucem eruuntur, et luculentis argumentis, experientia duce, demonstrantur. Ad Inlytum, et Eximum Virum Alexandrum Fabianum Novi orbis Indigenam.* 10 l.+201 pp.+3 l. 12mo. Amstelodami, ex officina Johannis Janssonii a Waesberge et Viduae Elizei Weyerstraet. *Amsterdam, 1677*  
 The author holds that every material in the world, organic or inorganic, is magnetic—*i.e.*, has some power of attracting or repelling. Hence, the division into animal magnetism and mineral magnetism. The sun is considered to be the most magnetic of all bodies. See Secs. ii. and iii., also the title-page.  
 —See also 102.



P. ATHANASIVS KIRCHERVS FVLDENSIS

ē Societ: Iesu Anno ætatis LIII.

*Honoris et observantiae ergo sculpsit et D.D. C. Bloemaert Romæ 2 May A. 1655.*

158. KIRCHER. (See No. 4377.)

CATALOGUE OF WHEELER GIFT

159. (Schott, Gaspar.) (1608-1666.) *Joco-Seriorum naturae et artis sive magiae naturalis centuriae tres* (auctore Aspasio Carameuli, i.e., Gaspar Schott); cui accessit *Diatribe de Crucibus* (A. Kircheri). 3 l.+304 pp.+1 l.+pp. 305-363+4 l., 22 plates. 4to. Francofurti, apud Joannem Arnoldum Cholimum.  
*Frankfort, 1667*  
 Collection of curious experiments in physics and secret writing.  
 —See also 102, 142.

160. Descartes, René. (du Perron.) (Renatus Cartesius.) (1596-1650.) *Epistolae; partim ab auctore Latino sermone conscriptae, partim ex Gallico translatae.* 2 parts in 1 vol., ill., pl. 4to. Londini, impensis Joh. Dunmore. *London, 1668*  
 These letters contain references to magnetic phenomena. Part i., p. 101; Part ii., pp. 150, 202, 365, and 403.  
 —See also 118.

161. Leotaud, Vincent. (1595-1672.) *Magnetologia in qua exponitur nova de magneticis philosophia.* 2 l.+420 pp.+3 l., ill. 4to. Lugduni, sumptibus Laurentii Anisson. *Lyons, 1668*  
 Scholarly work of the French Jesuit on the magnet. Unable to explain declination, p. 201; armed magnets, p. 274; effect of magnets on iron, p. 296; magnetic clock, p. 393.

162. Palladius. (368-430.) *Palladius de gentibus Indiae et Bragmanibus Graece et Latine.* S. Ambrosius de moribus Brachmanorum. Anonymus de Bragmanibus. Quorum priorem et postremum nunc primum in lucem protulit ex bibliotheca regia Edoardus Bissaeus. 23 l.+103 pp. 4to. Londini, excudebat T. Roycroft. *London, 1668*  
 The lodestone attracts the nails of ships; nails replaced by wooden pegs in vessels sailing for Tapiobane. Palladius was successively Bishop of Helenopolis and of Aspona in Galatia. See pp. 4 and 59.

163. Boyle, Robert. (1627-1691.) *Defensio doctrinae de elatere et gravitate aeris propositae a Robert Boyle, in novis ipsius physico-mechanicis experimentis adversus objectiones.* Francisci Lini ubi etiam objectoris funicularis hypothesis examinatur, eaque occasione nova quaedam experimenta adduntur, ab auctore supradictorum experimentorum. 15 l.+176 pp.+5 l. 16mo. Roterdami, ex officina Arnoldi Leers. *Rotterdam, 1669*  
 Defense of the author's views on the properties of air, especially its weight and elasticity.

164.— —*Nova experimenta physico-mechanica de vi aeris elastica et ejusdem effectibus, facta maximam partem in nova machina pneumatica ad (nepotem suum) D. Carolum literis pridem transmissa, ex Anglico in Latinam noviter conversa.* 12 l.+351 pp.+4 l., 1 plate. 16mo. Roterdami, ex officina Arnoldi Leers. *Rotterdam, 1669*  
 Magnet in vacuo, p. 85; magnetic effluvia, p. 101.

CATALOGUE OF WHEELER GIFT

165. — *Paradoxa hydrostatica novis experimentis evicta. Nuper ex anglico sermone in latinum versa.* 23 l.+240 pp., 3 plates. 16mo. Roterdami, ex officina Arnoldi Leers. *Rotterdam, 1670*  
Phenomena and laws of hydrostatics discussed. English edition, 1666.  
—See also 146.

166. **Lana, Francesco; (Lana-Terzi); (Tertius de Lanis).** (1631-1687.)  
Prodromo ouero saggio di alcune inuentioni nuoue premesso all'Arte Maestra Opera che prepara il P. Francesco Lana Bresciano della Compagnia di Giesu: Per mostrare li piu reconditi principij della Naturale Filosofia, riconosciuti con accurata Theorica, nelle piu segnalate inuentioni, ed isperienze sin' hora ritrouate da gli scrittori di questa materia et altre nuoue dell'autore medesimo. 4 l.+252 pp., 20 plates. Folio. Brescia, per li Rizzardi. *Brescia, 1670*  
Signaling by means of lights and flags, p. 44; method of weighing air, p. 52; balloons, p. 57; thermometer invented by author, p. 64; hygrometer, p. 68; telescope, p. 169; microscope, p. 214; air-ships and other inventions illustrated. The author, an Italian Jesuit, was Professor of Natural Philosophy in Brescia, his native city.  
—See also 197, 321.

167. **Boyle, Robert.** (1627-1691.) *Tractatus de cosmicis rerum qualitatibus, cosmicis suspicionibus, temperie subterranearum regionum, temperie submarinarum regionum, fundo maris, quibus praemittitur introductio ad historiam qualitatum particularium, Accessit denique tractatus de absoluta quiete in corporibus. Omnia ex anglica in latinam linguam conversa.* 7 parts. 6 l.+60+40+42+64+30+24 pp.+2 l.+57 pp.+1 l. 16mo. Amstelodami, apud Johannem Janssonium. *Amsterdam, 1671*  
The first tract treats of the cosmic qualities of bodies; the second, the temperature of subterranean and submarine regions.

168. — *Tractatus scripti a Roberto Boyle; ubi, I. Mira aeris (etiam citra calorem) rarefactio detecta. II. Observata nova circa durationem virtutis elasticae aeris expansi. III. Experimenta nova de condensione aeris solo frigore facta, ejusque compressione sine machinis. IV. Ejusdem quantitatis aeris rarefacti et compressi miri discrepans extensio.* 71 pp., 16mo. Londini, impensis Henrici Herringman. *London, 1671*  
Rarefaction and compression of air, with original experiments.  
—See also 146.

169. **Kircher, Athanasius.** (1601-1680.) *Ars magna lucis et umbrae, in X libros digesta. Quibus admirandae lucis et umbrae in mundo, atque adeo universa natura, vires effectusque uti nova, ita varia novorum reconditorumque speciminum exhibitione, ad varios mortalium usus penduntur. Editio altera priori multo auctior.* 810 pp., ill., 34 plates. Folio. Amstelodami, apud Joannem Janssonium. *Amsterdam, 1671*  
Comprehensive work on horography, astronomy and conics; reference to magnetic phenomena, p. 693. There is an error of 100 pp. in the pagination.  
First edition, 1643.  
—See also 102.

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170. **Guericke**, Otto von. (1602-1686.) *Experimenta nova Magdeburgica de vacuo spatio primum a G. Schotto, nunc vero ab ipso auctore perfectius edita, variisque aliis experimenta aucta, quibus accesserunt simul certa quaedam de aeris pondere circa terram de virtutibus mundanis et systemate mundi planetario.* 8 l.+244 pp.+2 l., ill., 2 plates, portr. Folio. Amstelodami, apud Joannem Janssonium. *Amsterdam, 1672*  
 Copies of this first edition are now very rare. This remarkable work on experimental philosophy ranks next to Gilbert's in the number and importance of the electrical discoveries described. Electric conduction and repulsion, the discharging power of points, the dissipation of charge by flames, the light due to electrification, the crepitating noises of small sparks are all recognized, pp. 147-150. The globe of sulphur, first of frictional machines, p. 148. Folio plate showing the Magdeburg experiment; also other noteworthy illustrations. (See No. 142.)

171. **Rohault**, Jacques. (1620-1675.) *Traité de physique.* 2 vols. 15 plates. 16mo. Amsterdam, Jacques le jeune. *Amsterdam, 1672*  
 Standard work of the time on physics, first edition, 1671. Chapter viii., Part iii., p. 254, treats of the magnet; the magnetic condition of crosses on church-spires, p. 281; declination in Paris, p. 296; effects of air, rust, heat, p. 299; amber and jet, p. 302; lines of force due to rubbed amber, p. 303; lightning and thunder, p. 363; the ringing of bells during electric storms, p. 371. A Latin translation with notes, made by Dr. Samuel Clarke, was used in the University of Cambridge prior to the publication of Newton's *Principia* in 1687.

171a.---(Latin translation.) *Tractatus physicus Gallice emissus et recens Latinitate donatus per Th. Bonetum, D. M. cum animadversionibus Antonii Le Grand.* 2 vols., pl., 8vo. Londini, G. Wells. *London, 1682*  
 Translation from the French edition of 1672. Part iii. contains a chapter on the magnet, p. 141; lines of force, p. 156; declination at Paris, p. 161; amber and jet, p. 165; lightning and thunder, p. 196.  
 ---See also 260.

172. **Boyle**, Robert. (1627-1691.) *Essays of the strange subtilty, determinate nature, great efficacy of effluviums, to which are annexed new experiments to make fire and flame ponderable, together with a discovery of the perviousness of glass.* 4 l.+69 pp.+1 l.+74 pp.+5 l.+85 pp.+3 l. 8vo. London, for M. Pitt. *London, 1673*  
 The first essay treats of the lodestone and its effluvium; the second, of electricity as a material emanation.  
 ---See also 146.

173. **Pfundt**, Ehrenfried. (---.) *Disputatio physica de magnete.* 14 l. Sm. 4to. Leucopetrae, F. Bruehl. *Weissenfels, (1673)*  
 Historical essay on the magnet. Some views of Kircher and Schott discussed.

174. **Boyle**, Robert. (1627-1691.) *New experiments about the preservation of bodies in Vacuo Boyliano.* 1 l.+17 pp. 12mo. London, M. Pitt. *London, 1674*  
 Beer soured by thunder, p. 10; not so when in vacuo, p. 11.



OTTO de GUERICKE  
Sereniss: et Potentiss: Elector: Brandeb:  
Consiliarius et Civitat: Magdeb. Consul:

170. GUERICKE. (Reduced.)

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175.—Observations about the growth of metals in their ore exposed to the air. 25 pp. 12mo. London, M. Pitt. *London, 1674*  
The observations refer to lead, iron, silver, gold.

176.—Tracts: i. Suspicions about some hidden qualities of the air, 71 pp.; ii. Observations about the growth of metals in their ore exposed to the air, 25 pp.; iii. Some additional experiments relating to the suspicion about the hidden qualities of the air, 13 pp.; iv. Animadversions upon Mr. Hobbes' problemata de vacuo, 8+94 pp.; v. Of the cause of attraction by suction, a paradox, 3+67 pp.; vi. New experiments about the preservation of bodies in Vacuo Boyliano, 17 pp. 12mo. London, M. Pitt. *London, 1674*

Remarks on exposing a magnet to the air by day, by night and at different seasons of the year.  
—See also 146.

177. **Oughtred**, William. (1573-1661.) Description and use of the double horizontal dyal, whereby not only the hour of the day is shewne but also the meridian line is found; whereunto is added the description of the general horological ring invented by W. O. London, for W. Leake. *London, 1674*  
Work on horology by the English divine and mathematician.

178. **Boyle**, Robert. (1627-1691.) Experiments, notes, etc., about the mechanical origine or production of divers particular qualities: among which is inserted a discourse of the imperfection of the chymist's doctrine of qualities; together with some reflections upon the hypothesis of alcali and acidum. (Twelve tracts, as below.) 8vo. London. E. Flescher. *London, 1675*

1.—Experiments and notes about the mechanical origine or production of divers particular qualities; together with some reflections upon the hypothesis of alcali and acidum. 1. 1.+23 pp. 2.—Of the mechanical origine of heat and cold. 1 1.+105 pp. 3.—Experiments and observations about the mechanical production of tastes. 35 pp. 4.—Experiments and observations about the mechanical production of odours. 31 pp. 5.—Of the imperfection of the chymist's doctrine of qualities. 50 pp. 6.—Reflections upon the hypothesis of alcali and acidum. 38 pp. 7.—Experiments and notes about the mechanical origine and production of volatility. 7 1.+56. pp. 8.—Experimental notes of the mechanical origine or production of fixtness. 34 pp. 9.—Experiments and notes about the mechanical origine or production of corrosiveness and corrosibility. 1 1.+69 pp. 10.—Of the mechanical causes of chymical precipitation. 3 1.+46 pp. 11.—Experiments and notes about the mechanical production of magnetism. 2 1.+20 pp. 12.—Experiments and notes about the mechanical origine or production of electricity. 1 1.+38 pp.

178a.—Two tracts on electricity and magnetism, reprinted from the rare editions of 1675 and 1676. With a preface by S(ilvanus) P. T(hompson). 84 pp. 16mo. *London, 1898*  
The preface of thirteen pages to these two important reprints is by Professor

Experiments and Notes  
ABOUT THE  
MECHANICAL ORIGINE  
OR  
PRODUCTION  
OF  
Electricity.

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By the Honourable  
*ROBERT BOYLE* Esq;  
Fellow of the *R. Society.*

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*L O N D O N,*  
Printed by *E. Flesher*, for *R. Davis*  
Bookseller in *Oxford.* 1675.

178. *BOYLE.*

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Silvanus P. Thompson, who remarks, p. 8, that the tract entitled *Of Electricity* is of great interest as being the first book on the subject of electricity published in England after Gilbert's *De Magnete*. The tracts are 11 and 12 of No. 178. (See No. 188.)  
—See also 146.

179. **Bond, Henry.** (— — .) *Longitude found, or a treatise shewing an easie and speedy way, as well by night as by day, to find the longitude, having but the latitude of the place, and the inclination of the magnetical inclinatore needle.* 71. + 65 pp. + 1 l. 7 plates. 4to. London, Henry Bond. *London, 1676*

Observations made by Borough, Gunter, Gellibrand and the author himself from which the secular change in magnetic declination is deduced; Bond introduced the word *inclination* to denote magnetic dip. This work was the subject of criticism by Hobbes, q.v. (See No. 185.) Bond was an instructor in navigation in London.

180. **Heidel, Wolfgang Ernest.** (— — .) *Johannis Tritheimii Steganographia quae hucusq; a nemine intellecta, sed passim ut suppositio perniciosa, magica et necromantica vindicata, reserata et illustrata a Wolfgang. E. Heidel.* 41. + 394 pp. + 2 l. 4to. Moguntiae, Zubrot. *Mayence, 1676*

Part i. contains an account of the life of Tritheim, a celebrated German writer and Benedictine monk who died in 1516; also vindication of steganography or secret writing. *Sympathetic compasses*, p. 358.

181\*. **Kirchmajer, Georg Caspar.** (Also Kirchmaier.) (1635-1700.) *Noctiluca constans et per vices fulgurans diutissima quaesita, nunc reperta; dissertatione brevi praevia de luce, igne, ac perennibus lucernis.* 12 l. 4to. Witteberga, M. Henckel. *Wittenberg, 1676*

Distinction between fire and light, p. 4; "fulminating" gold, p. 5; asbestos, p. 6; the diamond, p. 7.

—See also 189.

182. **Sturm, Johann Christoph.** (1635-1703.) *Collegium experientiale, sive curiosum in quo primaria hujus seculi Inventa et Experimenta physico-mathematica, speciatim Campanae vrinatoriae, Camerae obscurae, Tubi Torricelliani, seu Baroscopii, Antliae Pneumaticae, Thermometrorum, Hygroskopiorum, Microscopiorum, etc. Phaenomena et Effecta spectanda oculis subjecit; cum epistola ad Henricum Morum Cantabr. de Spiritu ipsius Hylarchico, etc.* 2 vols., ill. pl. 4to. Norimberga, sumptibus Wolfgangi Mauriti Endteri. *Nuremberg, 1676-1685*

Collection of experiments in hydrostatics, pneumatics and optics. Magnetic experiments, p. 230; magnetic field, p. 234.  
—See also 199.

183. **Dechales, Claude François Milliet.** (also Chales.) (1621-1678.) *L'art de naviguer démontré par principes et confirmé par*

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plusieurs observations tirées de l'expérience. 10 l.+274+46 pp.+4 l. 4to. Paris, Estienne Michallet. *Paris, 1677*

The preface contains list of works on the magnet arranged in *chronological* order; use of compass described at length, p. 88; magnetic declination in London and Paris, p. 100; latitude from magnetic dip, p. 217. The author was member of the Society of Jesus.

184. **Schott, Gaspar.** (1608-1666.) *Magia universalis naturae et artis, sive Recondita Naturalium et Artificialium rerum Scientia, cuius Ope per variam Applicationem activorum cum passivis, admirandorum effectuum Spectacula, abditarumque inventionum Miracula ad varios humanae vitae usus eruuntur. Opus quadripartitum.* Pars i. continet Optica. ii. Acoustica. iii. Mathematica. iv. Physica. Singularum Epitomen sequens Praefatio obiter, accuratius vero uniuscujusq. peculiare prae loquium exponit. Cum figuris aeri incisis. 4 vols. pl. 4to. Bambergae, sumptibus Joh. Martini Schoenwetteri.

*Bamberg, 1677*

The author discusses the sympathetic magnetic telegraph, Vol. iv, p. 49, and perpetual motion by means of magnets, p. 313, *et seq.* A manuscript translation of the part which treats of magnetic and sympathetic cryptography will be found at the end of the volume. Book iii., pp. 296-348, treats of the magnet and magnetic devices. The influence of the author's instructor, Kircher, is felt throughout. Von Guericke's Magdeburg experiments are referred to, Vol. iii., p. 554. (See No. 170.)

—See also 142.

185. **Hobbes, Thomas.** (1588-1679.) *Decameron Physiologicum; or Ten Dialogues of Natural Philosophy to which is added The Proportion of a straight line to half the arc of a quadrant.* 4 l.+136 pp.+4 l, 1 pl. 12mo. London, for W. Crook.

*London, 1678*

The author is the famous English philosopher and historian. Chapter ix. is a critique of Bond's *Longitude Found*. (See No. 179.) Speculation on the nature of magnetic attraction, p. 105.

186. **Schiele, Johann Georg.** (— — .) *Bibliotheca Enucleata; seu Artefodina artium ac scientiarum omnium exhibens apographa, elenchos, et pericopes in jurisprudentia, physica, etc., in alphabeti seriem digesta.* 9 l.+624 pp. pl. 4to. Ulmae, sumptibus auctoris.

*Ulm, 1679*

Book of reference giving under each article the names of works in which information will be found. *Acus magnetica* (the magnetic needle), p. 16; and *Magnes* (the magnet), p. 399.

187. **Boyle, Robert.** (1627-1691.) *Opera varia.* 3 vols. pl. portr. 4to. Genevae, apud Samuelem de Tournes. *Geneva, 1680-1693*

Vol. i., *Experimentum xvi.*; tract entitled "Nova Experimenta Physica-Mechanica;" *Magnetic effluvium*, p. 45; also p. 47 of "Tentamina Physiologica." Vol. ii. *Electrical effluvium*, cap. iv. "De insigni efficacia effluviorum."

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188.— Works epitomized by Richard Boulton. 4 vols., portr., pl. 8vo. London, for E. Phillips. *London, 1699-1700*  
 Vol. ii., p. 323 contains the author's famous tract *On the Mechanical Origin and Production of Electricity*, being the earliest work on electricity written in English, first edition 1675. (See 178.) Also, p. 315, the author's memorable tract *On the Mechanical Production of Magnetism*, published in 1676. (See 178.) Reversal of the polarity of a ship's compass, the stem of the ship being struck by lightning, p. 355. Lodestone in exhausted receiver, Vol. i., p. 481; bar of iron held vertically near compass, p. 202.

188\*a.— Works, to which is prefixed the life of the author. (Edited by Thomas Birch, F. R. S.) 5 vols., portr., Folio. London, for A. Millar. *London, 1744*  
 The life of Boyle is by Dr. Thomas Birch, F.R.S.; it comprises 94 pages and contains two letters by Newton on the ether of space. Most important are the tracts on the "Spring of Air" and the "Mechanical Production of Magnetism and Electricity." Magnetism developed in a "red-hot brick while cooling in the magnetic meridian, Vol. v., p. 81. First use of the term *barometer*, Vol. ii., p. 546.  
 —See also 146.

189. Kirchmajer, Georg Gaspar. (Also Kirchmaier.) (1635-1700.) *De phosphoro et natura lucis, nec non de igne commentatio epistolica.* 1 l.+72 pp.+3 l. Sm. 4to. Wittebergae, J. H. Ellinger. *Wittenberg, 1680*  
 On p. 70, reference to magnetic declination in London, Paris, Amsterdam and Hamburg. Refers to luminosity of fluor spar.  
 —See also 181.

190. Schott, Gaspar. (1608-1666.) *Schola steganographica, in classes octo distributa, Quibus, praeter alia multa, ac jucundissima explicantur Artificia nova, Quies quilibet, scribendo, Epistolam qualibet de re, et quocunque idiomate potest alteri absenti, eorundem Artificiorum conscientia, arcana animi sui conceptum, sine ulla secreti latentis suspicione manifestare; et scriptam ab aliis eadem arte, quacunque lingua, intelligere, et interpretari.* 16 l.+346 pp.+7 l. pl. tab. 4to. Norimbergae, sumptibus Johannis Andreae Endteri. *Nuremberg, 1680*  
 Systems of secret writing. Magnetic signaling by means of a pair of compasses, p. 258. *Daniel Schwenter* is referred to, p. 259, under his assumed name of *Janus Hercules de Sunde*. (See No. 73.) First edition, 1665.  
 —See also 142.

191. Kuhlmann, Quirinus. (1652-1689.) *Kircheriana de Arte magna Sciendi sive Combinatoria, admirabilibus quibusdam Inventis, Sapientia Infusa, Adamea Salomoneaque, post septennalem publicationem, orbe Europeo frustra ringente, consummatius emissa ad Ludovicum XIV. Regem Liligerum.* 48 pp. 8vo. Londini, imprimuntur a Johan. Gain pro Authore, ac prostant apud Guilelmum Cooper. *London, 1681*  
 Letters on scientific subjects written to Kircher by the author. (See No. 102.)

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192. **Senguerdius, Wolferdus.** (1646-1724.) *Philosophia naturalis quatuor partibus primarias corporum species, affectiones, vicissitudines et differentias exhibens.* 4 l.+302 pp.+13 l. ill. Sm. 4to. *Lugduni Batavorum, apud Danielem a Gaesbeeck.* *Leyden, 1681*  
Chapter on the magnet, p. 254.

193. **Hiller, Ludwig Heinrich.** (— — —.) *Mysterium artis steganographiciae novissimum, modum omnes epistolas, aliaque scripta incognita Characteribus furtivis exarata, in omnibus linguis, praesertim Latina, Germanica, Gallica, Italica expedite solvendi pandens.* 11 l.+478 pp.+4 l. 12mo. *Ulm, 1682*  
The art of secret writing. In the preface, Daniel Schwenter's work on steganography is referred to. On p. 278, *Janus Hercules de Sunde* is given as Schwenter's assumed name. (See No. 73.)

194\*. **Galtruche, Pierre.** (Also Gautruche.) (1602-1681.) *Mathematicae totius, hoc est arithmeticae, geometriae clara, brevis et accurata institutio.* 5 l.+305 pp.+2 l. 20 plates. 12mo. *London, 1683*  
Elementary work on mathematics and cosmography; the argument is that because the earth is a magnet, it neither turns on its axis nor revolves around the sun, p. 222; terrestrial magnetism, p. 227. The author was member of the Society of Jesus.

195\*. **Kast, Johann Joachim.** (— — —.) *Questionum decades duae De magnete.* 1 l.+26 pp.+2 l. 4to. *Argentorati, Staedel.* *Strasburg, 1683*  
Discussion of twenty questions about the magnet. Nature of magnetic attraction, p. 5; the earth as a magnet, p. 3; effect of arming a magnet, p. 23.

196. **Accademia del Cimento.** Essays of natural experiments made in the Accademia del Cimento under the protection of the most serene Prince Leopold of Tuscany, written in Italian by the secretary of that academy. Englished by Richard Waller. 12 l.+160 pp.+6 l. 19 plates. 4to. *London, for Benjamin Alsop.* *London, 1684*  
This collection contains papers describing experiments on light, sound and electricity. Amber rubbed in vacuo, p. 43; magnetic attraction across a vacuum, p. 53; magnetic screening, p. 124; rubbed amber and gems, p. 128; discharging action of flames, p. 129; electrical attraction is mutual, p. 130.

197. **De Lanis, Franciscus Tertius, (Lana-Terzi).** (1631-1687.) *Magisterium naturae et artis, opus physico-mathematicum, in quo occultiora naturalis philosophiae principia manifestantur, et multiplici tum experimentorum, tum demonstrationum, serie comprobantur; ac demum tam antiqua pene omnia artis inventa, quam multa nova ab ipso autvore excogitata in lucem proferuntur.* 3 vols. 57 plates. Folio. *Brixiae, per Jo. Mariam Ricciardum.* *Brescia, 1684-1696*  
Book xxii. of this encyclopaedia in three finely printed folio volumes,

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treats at great length of motion due to electric attraction and repulsion; Book xxiii., the same for magnetic attraction; magnetic clocks, p. 409; sympathetic compasses, p. 412; the compass and the dipping needle, Book xxiii., p. 227.  
—See also 166.

198. **Friderici**, Johannes Balthasar. (— — .) *Cryptographra; oder, Geheime schrift muend-und wuerckliche Correspondentz welche lehrmaessig vorstellet eine hoch-schaetzbare Kunst verborgene Schrifften zu machen und auffzuloesen.* 3 l.+880 pp. pl. 4to. Hamburg, G. Rebenlein. *Hamburg, 1685*  
Treatise on cryptography; code resembling that of Morse, p. 234; signaling by lights, p. 252; and by flags, p. 255.

199. **Sturm**, Johann Christoph. (1635-1703.) *Ad virum celeberrimum Henricum Morum Cantabrigiensem epistola, qua de ipsius principio hylarchico seu spiritu naturae et familiari modernis hydrostaticis aeris gravitatione et elatere.* 116 pp.+3 l. ill. 4to. Norimbergae, sumptibus Wolfgangi Mauriti Endteri. *Nuremberg, 1685*  
Pressure and flow of liquids, weight and elastic force of air.  
—See also 182.

200. **D(alancé**, Joachim). (— — .) *Traité de l'aiman, divisé en deux parties.* La première contient les expériences et la seconde les raisons que l'on en peut rendre par M. D \* \* \* 11 l.+140 pp.+4 l. 49 plates. Sm. 4to. Amsterdam, Henry Wetstein. *Amsterdam, 1687*  
General treatise (rare) on the magnet and its uses. Invention of the compass, p. 8; magnetic mountains of America, p. 12; declination, p. 45; disproval of magnetic suspension of Mahomet's coffin, p. 59; fallacy of magnetic unguents, p. 56; orientation of compass-needle in a magnetic field. The illustrations are quaint and suggestive, especially the one on the title-page.

200a.— —Another edition. 3 l.+45 pp. 34 plates. Sm. 4to. Liège. *Liège, 1691*  
The illustrations of magnetic phenomena are on a larger scale than in the first edition.

201. **Boulenger**, Jean. (— — .) *Traité de la sphère du monde.* 320 pp., map & ill. 8vo. Paris, Jean Jombert. *Paris, 1688*  
Extensive treatise on astronomy.

202\*. **Orpheus**. (— — .) *Argonautica, hymni et de lapidibus curante A. Chr. Eschenbachio cum ejusdem ad argonautica notis et emendationibus accedunt Henrici Stephani in omnia et Josephi Scaligeri in hymnos notae. Graece et Latine.* 329 pp. 12mo. Trajecti ad Rhenum, apud Guilelmum van de Water. *Utrecht, 1689*  
These argonautic poems are given in Greek and in Latin; magnetic references, pp. 209, 217, 241. Andreas Christian Eschenbach of Nuremberg, the editor of these Orphic poems was a distinguished Greek scholar, 1663-1705.

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200. DALANCE.

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203. Boyle, Robert. (1627-1691.) *Experimenta et observationes physicae*; wherein are briefly treated of several subjects relating to natural philosophy in an experimental way, to which is added a small collection of strange reports, in two parts. 5 l.+158 pp.+28 pp.+1 l. 12mo. London, for John Taylor. *London, 1691*  
 In the first 25 pages experiments are described in which lodestones are ignited, i.e., raised to a high temperature.  
 —See also 146.

204. Broun, Robert. (Scotus). (— — .) *Disputatio de fulmine. Praeses G. de Vries. (Dissertatio.)* 8 l. 4to. Trajecti ad Rhenum. *Utrecht, 1692*  
 Thunder-clouds, x.; effects of lightning, xi.; fig-tree and laurel-tree never struck, xi.

205. Vallemont, Pierre de (Abbé Le Lorrain de Vallemont.) (1649-1721.) *Description de l'aimant qui s'est formé à la pointe du clocher neuf de N. Dame de Chartres avec plusieurs expériences très curieuses, sur l'aimant et sur d'autres matières de physique.* 6 l.+215 pp. 12mo. Paris, Laurent d' Houry. *Paris, 1692*  
 Though entitled a discussion of the magnetic character of a piece of iron that belonged to the steeple of Notre Dame de Chartres, which was destroyed by a storm in 1690, this work is an important treatise on magnets and magnetic theory. Magnetic forces and corpuscles, p. 35; Descartes' whirling screw-like particles, p. 48; illustration of magnetic field due to the earth; iron-posts and fire-irons magnetized, p. 52; compass useless in high latitudes, p. 59; declination in London and Paris, p. 110; secular variation of declination, p. 111; invention of the compass, p. 100; magnetic signaling through a wall, p. 185; use of compass in traveling, p. 199; keeper strengthens the magnet, p. 203.

206.— —La physique occulte, ou, *Traité de la baguette divinatoire et son utilité pour la découverte des sources d'eau, des minières, des trésors cachés, des voleurs et des meurtriers fugitifs, avec des principes qui expliquent les phénomènes les plus obscurs de la nature.* 15 l.+609 pp. ill. 12mo. Paris, Jean Anisson. *Paris, 1693*  
 Treatise on the *Divining Rod*. Amber and jet, p. 82; magnetic dip at Paris, p. 130; description of dip-circle, p. 130; whirl of magnetic matter, p. 132; illustration of dip, p. 128; the American torpedo, p. 318; magnetic corpuscles more subtle than rays of light, p. 320.

206a.— —Another edition. 8 l.+422 pp. pl. 16mo. Paris, Jean Boudot. *Paris, 1696*  
 This edition has an appendix which gives on p. 32 an account of the sympathetic telegraph.  
 —See also 214.

207. Leybourn, William. (1626-1700 (?)). *Pleasure with profit; consisting of recreations of divers kinds, viz., numerical, geometrical, mechanical, statical, astronomical, magnetical and historical, published to recreate ingenious spirits, and to*

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Written by  
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the *King's-Bench*.

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Printed for *William Shropshire*, at the  
*Bible in Duck-lane, 1695.*

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induce them to make farther scrutiny in these sciences. To this work is also annexed a treatise of algebra, by R. Sault. 12 parts. 6 l.+56+86+31+24+63+28+13+9+9+11+26 pp.+ 2 l.+52 pp. ill. pl. Folio. London, for Richard Baldwin.

*London, 1694*

Work of recreative experiments.

—See also 209.

208. **Reeland**, Hadrian. (Also Reland.) (1676-1718.) *De libertate philosophandi*. 18 pp. 4to. *Trajecti ad Rhenum*. (Inaugural dissertation.) *Utrecht, 1694*

Academical thesis in favor of liberty in philosophical speculation.

209. **Sault**, Richard. (? -1702.) *A new treatise of algebra, apply'd to numeral questions and geometry*. 2 l.+52 pp. Folio. London for Richard Baldwin. *London, (1694)*

Work of some historical interest to the mathematical reader.

—See also 207.

210. **Smith**, John. (— — .) *Horological disquisitions concerning the nature of time and the reasons why all days, from noon to noon are not alike twenty-four hours long; to which is added rules for the ordering and use both of the quicksilver and spirit weather-glasses, and Mr. S. Watson's rules for adjusting a clock by the fixed stars*. 2 l.+92 pp. tab. 12mo. London, for Cumberland. *London, 1694*

Regulation of the pendulum for time-keeping purposes; one of the early works on the subject.

211. **Sorbière**, Samuel de. (1615-1670.) *Sorberiana, ou, Bons mots, rencontres agréables, pensées judicieuses et observations curieuses*. (*Mémoires pour la vie de S. Sorbière et J. B. Cotelier, dans une lettre écrite par M. Graverol. Epulæ Ferales sive fragmenti Marmoris Nemantini enodatio*. (by Graverol. Edited by G. L. Colomoyez.) 24 l.+246 pp. 16mo. Paris, Cramoisy. *Paris, 1694*

Criticism on Cardan, p. 69, on Descartes, p. 76, on Galileo, p. 100, and on Porta, p. 169.

212. **Hale**, (Sir) Matthew. (1609-1676.) *Magnetismus magnus; or, Metaphysical and divine contemplations on the magnet, or, loadstone*. 4 l.+159 pp. 12mo. London, for William Shroswbury. *London, 1695*

Religious and moral treatise by the celebrated English jurist. The discovery of the compass and its introduction into Europe, p. 48; molecular magnets, p. 55. "That every smallest particle of this magnet, every little dust thereof should have the very same conformation that the entire magnet had," p. 55.

213. **Harrison**, Edward. (— — .) *Idea longitudinis; being a brief definition of the best known axioms for finding the longitude; or, A more rational discovery thereof, than hath been heretofore published*. 8 l.+83 pp. 12mo. London, for Harrison. *London, 1696*

Four magnetic poles, p. 27; "Variation of Variation," p. 27; longitude

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cannot be found from the magnetic declination of a place, p. 27; annual variation, p. 28; no declination near the Azores, p. 39; Strada's poem, p. 46. (See No. 90.) Royal Society's lodestone, p. 47.

214. (Vallemont, Pierre.) (Abbé Le Lorrain de Vallemont.) (1649-1721.) *Traité de la connoissance des causes magnétiques des cures sympathiques des transplantations et comment agissent les philtres. Par un curieux de la nature.* 34 pp.+41. 12mo. (Amsterdam.) *Amsterdam, 1696*  
Magnetic signaling, p. 32; the rest of the booklet treats of sympathy, antipathy and philters.  
—See also 205.

215. Velsen, Bartholomaeus van. (— — .) *De honesto.* 14 pp. 4to. *Trajecti ad Rhenum.* (Inaugural dissertation.) *Utrecht, 1696*  
Metaphysical dissertation on "Honesty."

216. Zahn, Johann. (1641-1707.) *Specula physico-mathematico-historica notabilium ac mirabilium sciendorum.* 3 vols. pl. tab Folio. *Norimbergae, sumptibus Joannis Christophori Lochner.* *Nuremberg, 1696*  
List of writers on the magnet with appreciation of their work, Part ii., p. 68; armed lodestone, p. 69; healing influence of lodestone, p. 69; gagates and jet have medicinal properties, Part ii., p. 53. Zahn was a priest, member of the Premonstratensian order.

217. (Wallis, John.) (1616-1703.) A brief letter from a young Oxonian to one of his late fellow-pupils upon the subject of magnetism. 1 l.+14pp. 12mo. London, for S. Keble. *London, 1697*  
It is thought that this letter was written by the celebrated Dr. Wallis, Savilian Professor of Geometry at Oxford. See London *Electrical Review*, Jan. 30, 1891. P. 10 contains a "draught" illustrating the arrangement of magnetic lines of force.  
—See also 2448.

218. Zwinger, Theodor, (the younger). (1658-1724.) *Scrutinum magnetis physico-medicum, quo mirifici illius lapidis natura viresque e principiis mechanicis explicantur.* 4 l.+214 pp.+1 l. 12mo. *Basileae, ex officina Joh. Philippi Richteri.* *Basle, 1697*  
Comprehensive treatise on the magnet. Inventor of the compass, p. 45; declination observed by Cabot and Oviedo, pp. 46, 68, 158; dip by Norman, p. 46; magnetic lines of the earth defined, p. 50; action of nitric acid in weakening a magnet, p. 175; magnet with four poles, p. 175; medical uses of the magnet, p. 185.

219. Bartholinus, Caspar Thomas. (1655-1738.) *Specimen philosophiae naturalis praecipua physices capita exponens. Accedit de fontium fluviorumque origine ex pluvii, dissertatio physica.* 7 l.+175 pp.+2 l.+26 pp. 12mo. *Oxoniae, impensis Henr. Clements.* *Oxford, 1698*  
Properties of the magnet, p. 80; magnetic impulsion is not attraction, p. 81; Cartesian views of magnetic matter, p. 83.

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219a.— —Another edition. 6 l.+164 pp.+2 l.+23 pp. 16mo. Oxoniae, Henr. Clements. *Oxford, 1703*

220. (Puget, Louis de.) (1629-1709.) Lettres écrites à un philosophe sur le choix d'une hypothèse propre à expliquer les effets de l'aimant. 1 l.+138 pp. 12mo. (Lyons, 1699) Defense of the Cartesian doctrine of the earth's magnetism against twenty-three objections.

221. Blom, Leonard. (— —.) De anno seculari 1700. 10 pp. 4to. Trajecti ad Rhenum. (Exercitatio Philosophica.) *Utrecht, 1700* Remarks on the beginning of century-years.

222. Cesi, Innocenzo. (1652-1704.) De meteoris dissertatio. 6 l.+ 89 pp. 12mo. Mantuae, A. Pazzo. *Mantua, 1700* Work on general meteorology showing how to produce many curious natural phenomena; lightning and thunder, p. 37.

223.— —De qualitatibus dissertatio. 5 l.+204 pp. 12mo. Mantuae, A. Pazzo. *Mantua, 1700* Electric attraction due to thread-like particles and magnetic effluvia, p. 157; discharging power of flames, p. 152; the earth's magnetism, pp. 157, 164, 172; how a magnet may be weakened, p. 178; its strength preserved, p. 180.

224\*. Martius, Johannes Nicolaus. (— —.) Dissertatio inauguralis physico-medica, De magia naturali, ejusque usu medico ad magice et magica curandum. 44 pp. 4to. Erfordiae, excudebat J. H. Grosch. *Erfurt, 1700* Thesis submitted for the degree of Licentiate in Medicine. Various kinds of natural magic, p. 12; the siphon, p. 17; uses of the magnet in medicine, pp. 28, 31, 36.

225. Le Brun, P(ierre). (1661-1729.) Histoire critique des pratiques superstitieuses, qui ont seduit les peuples et embarrassé les savans. Avec la méthode et les principes pour discerner les effets naturels d'avec ceux qui ne le sont pas, par un prêtre de l'oratoire (i.e., Rev. Pierre Le Brun). 2 vols. 12mo. Rouen, Behourt. *Rouen, 1701-1702* Critical history of superstitious practices. This is a copy of the first edition. Vol. i., p. 293, disbelief in magnetic communication between distant persons.

226†. Bergerac, Savinien, Cyrano de (1629-1655.) Les œuvres de Monsieur de Cyrano de Bergerac. 2 vols. portr. 12mo. Cologne. *Cologne, 1703* Considerations on physics and cosmography. Vol. ii. contains the "Comic History of the States and Empires of the Moon," which may have suggested to Dean Swift the idea of *Gulliver's Travels*. This work, which passed through many editions in the latter half of the Seventeenth Century, contains numerous speculations on matters pertaining to the domain of science. One of the many curious passages in the *Voyage to the Sun*, vol. ii., p. 227, relates that when at a certain distance from that luminary, the human body becomes transparent so that the bones and internal organs may be seen. The author was of the swashbuckler type and is thus portrayed in Rostand's play.

though it should be made *in vacuo*, where the Impediment of the *Medium* could make very little or no Alteration.

Having enumerated some of the most remarkable Properties of Gravity, we come in the next place to consider what may be the Cause thereof.

And first, I believe I shall not need to say much against the Opinion of *Intelligent Mater*, which supposes every part of Matter to act understandingly; for that being supposed, all Philosophy is vain, and there needs no farther Inquiry into Nature.

And secondly, I have as little to say to its *Cousin-german* Opinion, *viz.* the *Regimen of an Hylarchick Spirit*.

And 3ly, The *Epicurean* Atoms seem to me to give as little of Explanation almost as either of the former.

And 4ly, For the *Peripatetic* Doctrine of tendency to the Center of the *Universe*, besides that the Foundation is false, the Earth being proved not to be in the Center, 'tis not yet understood what the tendency is.

5ly, The *Cartesian* Doctrine, and that of Mr. *Hobbes*, are both insufficient, because they do not give any reason why Bodies should descend towards the Center under or near the Poles.

6ly, Nor will the *Magnetism* of *Gilbert* or *Kepler* serve; for, as I shall afterwards shew, that is a Propriety distinct from Gravity, and of quite another nature.

It must therefore be somewhat else differing from all these, which by reason *What the Cause of Gravity is.* of its acting by the means of some very insensible Body, it will be very hard to demonstrate, yet not altogether impossible. We find then that a Propriety somewhat like this is to be found in the Attraction of the Magnet and Iron. Another somewhat like it is to be found in Amber, Jet, Glafs, Chrystal, Diamonds, and several hard Bodies upon Rubbing: And more instructive yet to this Inquiry is the Experiment of Mr. *Newton*, of rubbing a Plate of Glafs, which is laid over some small bits of Paper, or other light Bodies, at some distance, by which Rubbing the Papers are made to rise up towards the Glafs, and stick fast to it. Now in all these Experiments there is a sensible Attraction of Grave Bodies to the respective attracting Bodies, or at least a Motion of those Bodies towards one another; though in all, the *Medium*, that causes this Endeavour of Motion, be insensible. Some have supposed for Amber, that the same being a very unctuous Body, certain stringy unctuous *Effluvia* are sent out, which sticking to the light Bodies, are drawn into the Amber again, and so bring back with them the light Bodies. But this is very hard to be supposed of Glafs or Chrystal, and least of all of a Diamond, which yet will have a considerable Electricity, as 'tis called, upon Rubbing; Besides, 'tis evident by Mr. *Newton*'s Experiment, that the greatest Electricity of Glafs is at the very time when it is hardest rubbed, which should be the time when these unctuous Strings should be sent out; 'tis necessary therefore that some other Medium must be found than these unctuous and stringy Emanations.

If we farther consider of these Experiments, we shall find that there is in all these a necessity of an internal vibrative Motion of the Parts of the Electrick Bodies, and that so soon as ever that Motion ceases, the Electricity also ceases: We may therefore conclude, that there may be such an internal Motion of the Parts of some Bodies, as may cause an Electrical Virtue in them, whereby they will be able to draw, with some small Degree of Power, some Bodies to them.

I have already here produced several Experiments, whereby I have shewn how mechanically to produce such an Attraction towards the acting Body. The first was that of a Body placed upon a wooden Rod, the one End of which was kept in its place by a Spring, and the other was struck by a Hammer, whereby it plainly appeared, that at every Stroke the Body was moved on the Rod towards the Hammer that struck. Here the *Aether* was resembled to a Solid. By the second Experiment, where a Ball poised in Water descended toward the striking Part, I shewed how the same Effect might be done by a fluid Medium, as in the other was done by a Solid. In the third was shewn how a Fluid also might

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227. **Hooke, Robert.** (1635-1702.) Posthumous works containing his Cutlerian lectures and other discourses read at the meetings of the Royal Society. Illustrated with sculptures. To these discourses is prefixt the author's life published by Richard Waller. 3 l.+xxviii.+572 pp.+6 l. 13 plates. Folio. London, Waller. *London, 1705*  
 On p. 183, the author holds that electrification is caused by vibratory motion and not by emissions of effluvia. The luminous radiation (electric light) observed in the dark when a diamond is briskly rubbed is attributed, p. 54, to the same molecular motion. A discourse on variation begins on p. 484. Lightning and thunder, p. 424.  
 —See also 262.

228. **Howard, Edward.** (— — .) Copernicans of all sorts, convicted by proving, that the earth hath no diurnal or annual motion as is suppos'd by Copernicans, from the beginning of the world to this day: As also that their hypothesis is astronomically, philosophically, and sensibly false, to all impartial apprehensions. To which is annex'd a treatise of the magnet, as also how to find the annual variation of the compass. 4 l.+125 pp. 2 plates. Sm. 12mo. London, for Jeffery Wale. *London, 1705*  
 Tract on magnetic variation, beginning p. 76. Very rare.

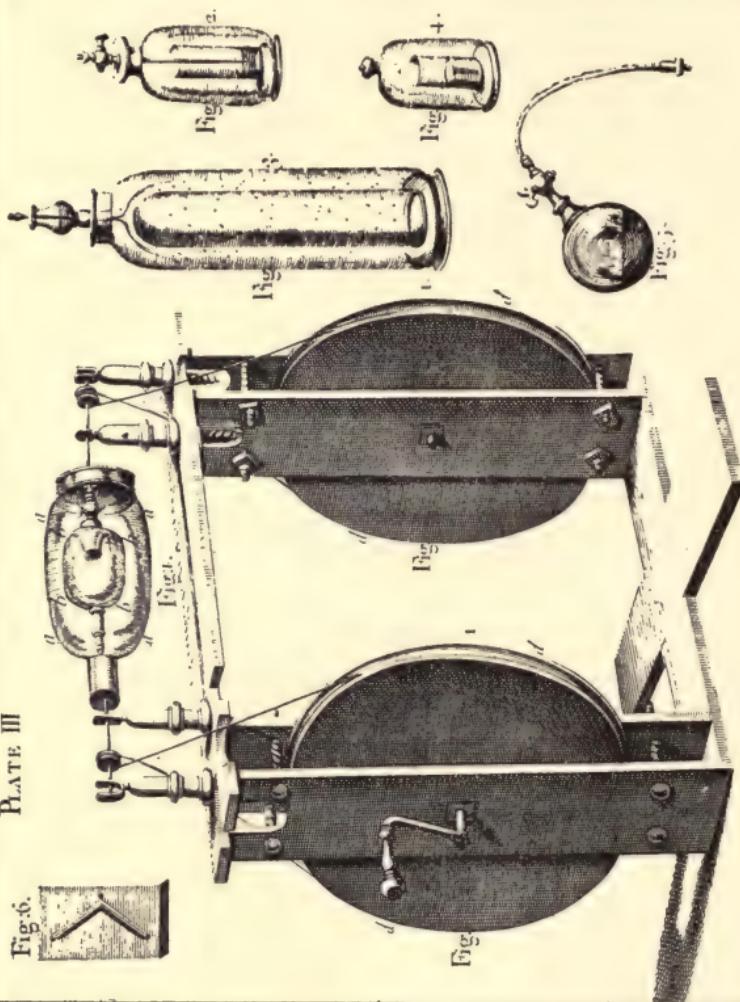
229. **Purshall, Conyers.** (— — .) An essay at the mechanism of the macrocosm: or, The dependence of effects upon their causes, in a new hypothesis. 8 l.+336 pp. 8vo. London, for Jeffery Wale. *London, 1705*  
 Continuous character of magnetic "streams," p. 267; they pass through gold, a man's body, or a vacuum, but are stopped by iron, p. 267; pores and magnetic particles, p. 270; "field" due to spherical magnet, p. 273; magnetization of iron bar while cooling in a vertical position, p. 275; sympathetic powder, p. 279.

230. **Borst, Jacobus van der.** (— — .) De libertate mentis humanae. 9 pp. 4to. Trajecti ad Rhenum. (Dissertatio Pneumatica.) *Utrecht, 1707*  
 Dissertation on the liberty of the human mind.

231\*. **Andala, Ruard.** (1665-1727.) Exercitationes Academicae in Philosophiam primam et naturalem; in quibus philosophia Renati Des-Cartes clare et perspicue explicatur confirmatur, necnon vindicatur. 81.+26+590 pp.+9 l. 3 plates. 4to. Franequerae, ex officina Wibii Bleck. *Franecker, 1709*  
 Twenty-four pages on the magnet: its history, polarity, orientation, and declination. Difference between electric and magnetic attraction, p. 570. The author was a follower of Gilbert; Descartes is named the "Architect of Experimental Philosophy."

232. **Hauksbee, F(rancis.)** ( ? -1713.) Physico-mechanical experiments on various subjects, containing an account of several surprising phenomena touching light and electricity, producible on the attrition of bodies, together with the explana-

PLATE III



232. HAUKSBEY. (Reduced.)

CATALOGUE OF WHEELER GIFT

tions of all the machines and other apparatus used in making experiments. 7 l.+194 pp. 7 plates. 4to. London, for the author.

London, 1709

Important contribution to the study of electric phenomena. This is a copy of the first edition, now very rare. Light due to friction of mercury against sides of exhausted glass-globe recognized as "flashes of lightning," p. 9; electric induction, p. 37; vacuous globe glows when rubbed externally, p. 41; violent repulsion, p. 42; crackling noise, pp. 52, 56; exhausted globe lit up when near a second one containing air and rubbed externally, p. 62. This work attracted much attention at the time and was translated into French and Italian.

232a.—Second edition. With a supplement containing several new experiments not in the former edition. 8 l.+336 pp. 8 plates. 8vo. London, for J. Senex.

London, 1719

232b.—(French translation.) *Expériences physico-méchaniques sur différents sujets, traduites de l'anglais par feu M. de Brémond. Revues et mises au jour, avec un discours préliminaire, des remarques et des notes par M. Desmarest.* 2 vols. 6 plates. 12mo. Paris, Veuve Cavelier.

Paris, 1754

233. **Reinzer, Franz.** (—.) *Meteorologia philosophico-politica in duodecim dissertationes per quaestiones meteorologicas et conclusiones politicas divisa, appositisque symbolis illustrata.* 5 l.+297 pp.+3 l. ill. pl. Folio. Augustae Vindelicorum, impensis Jeremiae Wolfii.

Augsburg, 1709

Work on general meteorology. Effects of lightning, p. 48; thunder-storm, p. 52; objects most and least liable to be struck, p. 53; amber and electric force, p. 257; armed magnet, p. 273; magnetic field mapped out by iron filings, p. 274; magnetism of the earth, p. 275. The engravings form a feature of the work.

234. **Henghel, Daniel van.** (—.) *De conjunctione mentis cum corpore humano.* 35 pp. 4to. Trajecti ad Rhenum. (Inaugural dissertation.)

Utrecht, 1710

On the union of the mind and body, a philosophical dissertation.

235. **Torfaeus, Thormodr.** (Thormodur Torfesen.) (1640-1719.) *Historia rerum Norvegicarum, in qua praeter Norvigae descriptionem, primordia gentis, instituta, mores, incrementa, etc., et quaecunque ad Regni Norvegici illustrationem spectant, luci publicae exponuntur.* (With a dedication by C. Reitzer.) 4 vols. Folio. Hafniae, ex typographeo Joachimi Schmitgenii.

Copenhagen, 1711

First edition of this celebrated history of Norway by the Icelandic historian. Reference to the use of the compass for navigation purposes in the year 1266, Part iv., p. 345. See also the article *magnetism* in the *Encyclopaedia Metropolitana*, p. 737. (See No. 2645.)

236. **Billingsley, Case.** (—.) *Longitude at sea, not to be found by firing guns, but the only true method by the sun, moon or stars.* 28 pp. 12mo. London, for Richard Mount.

London, 1714

The earth kept together and upheld in space by magnetic attraction, p. 11.

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237. **Browne**, Robert. (— — —) Methods, propositions and problems for finding the latitude and longitude at sea by coelestial observations only and also by Watches, etc. 20 pp. 8vo. London, for the author. *London, 1714*  
The author uses lunar distances and the position of known stars for determining latitude.

238. **Clarke**, James. (— — —) An essay wherein a method is humbly propos'd for measuring equal time with the utmost exactness without the necessity of being confin'd to clocks, in order to discover the longitude at sea. 1 l.+32 pp. ill. 12mo. London, for J. Morphew. *London, 1714*  
*Clepsydra*, in which *mercury* is used instead of water.

239. **Derham**, William. (1657-1735.) Physico-theology; or, A demonstration of the being and attributes of God from his works of creation. Being the substance of xvi sermons, preached at Mr. Boyle's Lectures in the years 1711 and 1712. With large notes and many curious observations never before published. Third edition. 8 l.+447 pp.+6 l. pl. 8vo. London, for W. Innys. *London, 1714*  
The first edition appeared in 1713. Magnetic orientation and variation, p. 277; invention of printing, p. 278.

239a.—Eighth edition. 8 l.+xvi.+444 pp.+6 l. pl. 8vo. London, for W. Innys. *London, 1732*  
—See also 263.

240. **Plank**, Stephen. (— — —) An introduction to the only method for discovering longitude. Presented to both Houses of Parliament. 8 pp. 12mo. London, for the author. *London, 1714*  
This "introduction" is limited to eight pages on chronometers and the determination of local time.

241. **Reimann**, Christoph Friederich. (— — —) De succino electricorum principe. Praeses H. von Sanden. 36 pp. 4to. Regiomonti, Reusner. (Inaugural dissertation.) *Konigsberg, 1714*  
Academic discussion of current views on electrical theory.

242. **Whiston**, William. (1667-1752) and Humphrey **Ditton**. (1675-1715.) New method for discovering the longitude both at sea and land, humbly proposed to the consideration of the publick. 78 pp.+1 l. 12mo. London, for John Phillips. *London, 1714*  
Curves of magnetic variation, p. 15; sound heard at a distance of 100 miles, p. 19. Whiston was a celebrated philosopher and divine, and Professor of Mathematics at Cambridge.  
—See also 245, 256.

243. **Dunnehaupt**, Albert Christian. (— — —) Sphaericam teluris figuram disputatio postrema. 16 pp. 4to. Vitembergae, Chr. Schroeder. *Wittenberg, 1715*  
Early work on the form of the earth.

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244. **Oostendorp, Johannes.** (— — .) *De dimensione linearum rectarum.* 23 pp. 1 plate. 4to. *Trajecti ad Rhenum, G. van der Water.* (Inaugural dissertation.) *Utrecht, 1716*  
Speculation on the dimension of a straight line.

245. **Whiston, William.** (1667-1752.) *An account of a surprising meteor, seen in the air March the 6th, 1715-16 at night.* 78 pp. 12mo. London, for J. Senex. *London, 1716*  
Brief account of an aurora borealis seen by the author to which he adds descriptions of other remarkable aurorae.  
—See also 242.

246. **Huet, Pierre-Daniel.** (1630-1721.) *History of the commerce and navigation of the ancients, made English from the Paris edition.* 16 l.+265 pp. 8vo. London, for Lintot. *London, 1717*  
On p. 48 it is stated that the Greeks guided their ships by the Great Bear and the Phoenicians by the Little Bear. The author, one of the most learned men of France and principal editor of the celebrated edition of the Latin classics *ad usum Delphini*, was Bishop of Avranches. Dr. Edward Weston possesses the 1600 edition of Gilbert's *De Magnete*—an uncorrected copy—which formerly belonged to Bishop Huet. It contains MS. notes, as well as the Bishop's arms and very rare book-plate.

247. **Lueders, Gerhard.** (— — .) *De methodis demonstrandi declinationem magnetis variam et inconstantem.* 56+16 pp. 1 plate. 4to. *Vitembergae, St. Gerdesianus.* (Inaugural dissertation.) *Wittenberg, 1718*  
Two rare pamphlets on magnetic declination with tables of same from Kircher. According to Hellmann's *Rara Magnetica*, the first printed reference to magnetic declination occurs in a work by Francisco Falero, published in 1535.

248. **Polinière, Pierre.** (1671-1734.) *Expériences de physique.* 2nd. edition. 4 l.+553 pp.+12 l. pl. 12mo. Paris, Jean de Laulne. *Paris, 1718*  
Collection of typical experiments with magnets. Explanations based on the Cartesian theory of pores and screw-like particles. Magnet in vacuo, p. 265; lifting power of a N-seeking pole less in the Southern than in the Northern hemisphere, p. 269; magnetization of vertical bars, p. 271; declination and dip, p. 296; causes of electrical attraction, p. 298. There are numerous magnetic diagrams at the end of volume. First edition, 1709.

249. **Desaguliers, J(ean) T(héophile).** (1683-1744.) *Lectures of experimental philosophy, to which is added a description of Mr. Rowley's machine called the orrery, all carefully corrected by Mr. Desaguliers.* 10 l.+201 pp. 3 l. ill. 10 plates. Sm. 4to. London, for W. Mears. *London, 1719*  
Fundamental principles of mechanics and hydraulics. Desaguliers held a high place among the savants of his day.  
—See also 306, 364.

250. **Newton, (Sir) Isaac.** (1642-1727.) *Optice sive de reflexionibus, refractionibus, inflectionibus et coloribus Lucis libri tres.*

*liquores* inter se permixti, quorum particulæ cum impetu concurrunt; ut *oleum vitrioli* a *nitro* pari pondere distillatum, dein dupla portione mixtum cum *oleo caryophyllorum*, sive *annisi*. Similiter globus vitreus, diametro circiter 8 aut 10 unciarum, machinae versatili infixus, ut circa axem suum motu celerrimo circumagatur; qua sui parte vola manus apposita inter volvendum confricetur, lucebit. Quod si eodem tempore charta alba, aut linteum album, vel etiam digitus extremus ita admoveatur, ut circiter quarta vel dimidia unciaæ parte distet a vitro, qua parte motus ejus est celerrimus; vapor electricus frictione manus e vitro excitatus, & ad chartam albam, linteum, vel digitum allisus, ita agitatitur, ut lucem continuo emitat, efficiatque ut charta illa alba, linteum, vel digitus, tanquam cicindela, lucescat: Quin & e vitro erumpens, ea vi nonnunquam ad digitum allidetur, ut etiam tactu percipi queat. Quod idem quoque evenit, quando cylindrus e vitro electrove, longus & amplius, charta manu admota eosque confricetur, donec vitrum incaluerit.

*Qu. 9.* Annon Ignis, corpus est eosque calefactum, ut copiosius lumen emittat? Quid enim aliud est ferrum candens, nisi ignis? Quidve aliud est carbo candens, nisi lignum eosq; calefactum, ut id lumen emittat?

*Qu. 10.* Annon Flamma, vapor est, fumus, sive exhalatio candefacta; hoc est, calefacta usque eo, ut lumen emittat? Corpora enim flammarum non concipiunt, nisi si emittant fumum copiosum; qui porro fumus, ardet in flamina. *Ignis fatuus*, est vapor sine calore lucens: Et

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Latine reddidit Samuel Clarke. 2nd edition. 8 l.+415 pp. 12 plates. 8vo. Londini, ex officina Gulielmi Bowyer.

London, 1719

Light emitted by bodies when agitated by heat, friction, or percussion, p. 341; electric glow, p. 342; magnetic and electric attraction, p. 380. The first edition of this famous work on theoretical optics appeared in 1704.

—See also 639.

251. **Norwood, Richard.** (1590 (?)–1675.) The seaman's practice, containing a fundamental problem in navigation, experimentally verified; namely touching the compasse of the Earth and Sea, and the quantity of a degree in our English measures. With certain tables and other rules used in navigation, the variation of the compass. 104 pp. 4to. London, for R. Mount.

London, 1719

Use of the compass in navigation, p. 85; first edition, 1637; Norwood was among the first to determine the length of a degree of the meridian.

—See also 284.

252. **s'Gravesande, William James.** (1688–1742.) Mathematical elements of physicks, prov'd by experiments; being an introduction to Sir Isaac Newton's philosophy; made English and revis'd and corrected by John Keill. 2 vols. 33 plates. 8vo. London, for G. Strahan.

London, 1720

s'Gravesande introduced the Newtonian philosophy into the University of Leyden in which he held the chair of mathematics and astronomy. (See No. 639.)

252a.——Mathematical elements of natural philosophy, confirmed by experiments; or, An introduction to Sir Isaac Newton's philosophy. Translated into English by J. T. Desaguliers. 3rd edition. 2 vols. 58 plates. 8vo. London, for Senex.

London, 1726

Vol. ii. belongs to the second edition. Electrical experiments, vol. ii.; electrification, a vibratory motion, p. 7; luminous mercury fountain, p. 12.

252b.——(Latin edition.) Physices elementa mathematica, experimentis confirmata, sive introductio ad philosophiam Newtoniam. Editio tertia. 4to. Leidae, apud Johannem Arnoldum Langerok.

Leyden, 1742

Electrical machine described, p. 669; contrivance for revolving bodies in vacuo, p. 680; electrification due to the breakage of crystals, p. 680.

—See also 448.

253. **Magalotti, Lorenzo.** (1637–1712.) Lettere scientifiche ed erudite. Con ritratto. xxiv+303 pp. portr. 4to. Firenze, Tartini e Franchi.

Florence, 1721

Remarkable letters on physical subjects: air pressure and the attraction of rubbed amber, p. 79; magnet in vacuo, p. 93; experiment with amber, p. 214.

253a.——Another edition. xii+396 pp. portr. 8vo. Milan. (Si pubblicarono nella Raccolta de Classici Italiani.) Milan, 1806

—See also 678.

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254. **Ode, Jacob.** (1698-1751.) *De atmosphaera.* 88 pp. 1 plate. 4to. *Trajecti ad Rhenum, G. van de Water. (Inaugural dissertation.)* *Utrecht, 1721*  
 Various phenomena of the atmosphere.  
 —See also 258, 277.

255. **Radae, Philipp.** (— — .) *De habitibus intellectus et voluntatis.* 40 pp. 4to. *Trajecti ad Rhenum. (Inaugural dissertation.)* *Utrecht, 1721*  
 Philosophy of volition.

256. **Whiston, Will(iam).** (1667-1752.) *Longitude and latitude found by the inclinatory or dipping needle wherein the laws are also discovered, to which is prefix'd an historical preface.* 2 l.+xxviii+115 pp.+1 l. chart. 12mo. London, for Senex.  
*London, 1721*  
*Tract on magnetic phenomena, declination and dip. Law of distance, p. 15; small oscillations, p. 28; magnetic attraction balanced against gravity, p. 30; horizontal component and total force, p. 34; lines of equal dip, p. 41; Hudson's magnetic observations, p. 53.*

256a.— —Another edition, to which is prefix'd an historical preface, and to which is subjoined Mr. R. Norman's *New Attractive or account of the first invention of the dipping needle.* 2 l.+xxviii+115 pp.+4 l.+43 pp. chart. ill. 8vo. London, for Senex.  
*London, 1721*  
 "Boussole" from box, boxel, iv.; declination said to have been discovered by Cabot in 1500, v.; variation of declination, vi.; movable magnetic poles, viii.; Halley's four poles, ix.; dip discovered, xiii.; loss of weight said to accompany magnetization; law of distance, 13; south magnetic pole, p. 54. (See No. 66.)  
 —See also 242.

257. **Musschenbroek, Pieter van.** (1692-1761.) *Oratio de certa methodo philosophiae experimentalis.* 53 pp. 4to. *Trajecti ad Rhenum, G. van de Water. (Inaugural dissertation.)* *Utrecht, 1723*  
 Method to be followed in experimental philosophy; the author, who was Professor of Natural Philosophy in the University of Leyden, was among the great instructors and investigators of his day.  
 —See also 268, 276, 300, 312, 383, 427.

258. **Ode, Jacob.** (1698-1751.) *Oratio de laudibili priscorum hominum philosophandi methodo.* 52 pp. 4to. *Trajecti ad Rhenum. (Inaugural dissertation.)* *Utrecht, 1723*  
 Discourse on the philosophical methods and systems of some ancient philosophers.  
 —See also 254.

259.\* **Quellmalz, Sam(uel) Theodor.** (1696-1758.) *Dissertatio physica de magnete.* 15 pp. 4to. Lipsiae. *Leipzig, 1723*  
 The magnet and its poles, p. 4; magnetic effluvia, p. 5; nature of the lodestone; why artificial magnets are the stronger, p. 14.

260. **Rohault, Jacques.** (1620-1675.) *System of natural philosophy, illustrated with Dr. Samuel Clarke's notes taken mostly out*

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of Sir Isaac Newton's Philosophy, with additions done into English by John Clarke. 2 vols. 27 plates. 8vo. London, for James Knapton.

London, 1723

Standard work on physics. Discussion of what was known on the magnet in the author's time. Attraction between the lodestone and iron is mutual, p. 163; continuity of magnetic matter; field shown by filings, p. 177; magnetization of fire-irons and church-crosses, p. 175; why armed lodestones have greater lifting power, p. 181; iron affords freer passage to magnetic matter than air, p. 186; field due to rubbed amber, p. 187; lightning and thunder, p. 219; thunderbolt and thunderstone, p. 221; effect of ringing bells during an electric storm, p. 222. (See No. 639.)

—See also 171.

261. **Santanelli, Ferdinando.** (— — —) *Philosophiae reconditae sive Magicae magneticae mumialis scientiae explanatio.* 4 l.+ 108 pp. 4to. Coloniae. Cologne, 1723  
Cap. xiv. is entitled "Magnets and magnetic sorcery."

262. **Hooke, Robert** (1635-1702) and others. *Philosophical experiments and observations by Robert Hooke and other eminent Virtuosos in his time, published by W. Derham.* 4 l.+391 pp.+4 l. ill. 4 plates. 8vo. London, W. and J. Innys.

London, 1726

Papers on various scientific subjects: history of the barometer, pp. 3 and 169; magnetism of drills and chisels, p. 129; ether the medium of propagation of light, p. 144; invention of the telescope, p. 257; magnetic declination at Alexandria, p. 300; origin of amber and jet, p. 315.

—See also 227.

263. **Royal Society of London.** *Miscellanea curiosa, containing a collection of some of the principal phaenomena in nature, accounted for by the greatest philosophers of this age. Discourses read and delivered to the Royal Society; also a collection of curious travels, voyages, antiquities, and natural histories of countries; to which is added A discourse of the influence of the sun and moon on human bodies by R. E. Mead and also Fontenelle's preface of the usefulness of mathematical learning.* 3rd edition. Vol. i. (complete in 3 vols.) revised and corrected by W. Derham. 8vo. London, for J. and J. Knapton. London, 1726

Theory of four terrestrial magnetic poles, p. 41; declination at London and Paris, p. 45.

264. **Arntzen, Wilhelm.** (— — —) *De origine animae humanae.* 49 pp. 4to. Trajecti ad Rhenum, Alex. van Megen. (Inaugural dissertation.) Utrecht, 1728  
Philosophical inquiry into the origin of the soul.

265. **Geisweit, Wilhelm.** (— — —) *De figura telluris sphaerica.* 43 pp. 4to. Trajecti ad Rhenum, Alex. van Megen. (Disputatio philosophica.) Utrecht, 1729  
Paper on the form of the earth.

Fig. 1.

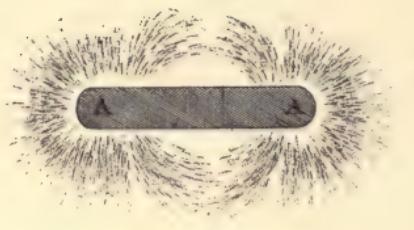


Fig. 6.

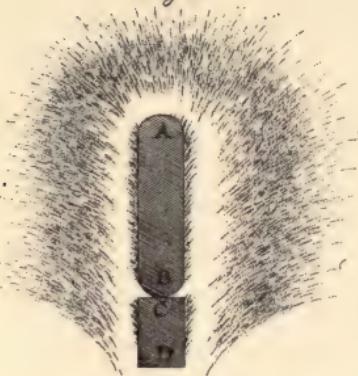


Fig. 7.

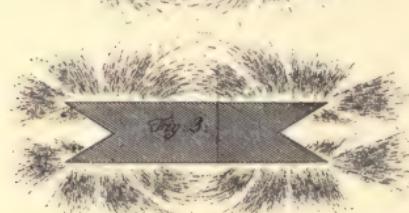
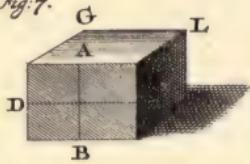


Fig. 4.



Fig. 8.

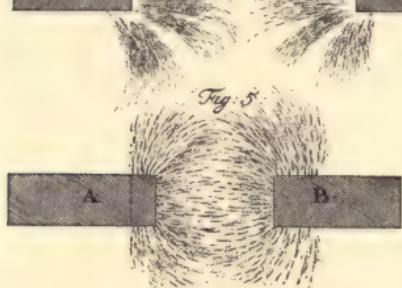
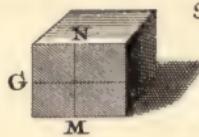


Fig. 9.



268. MUSSCHENBROEK. (Reduced.)

CATALOGUE OF WHEELER GIFT

266. (Hamilton, James) (vi. Earl of Abercorn.) (1656-1734.) Calculations and tables relating to the attractive virtue of loadstones, serving to the finding out the comparative degrees of goodness between several of them; also to know how much any loadstone, being of any proposed weight would sustain and also to know the value in money of any loadstone. 1 l.+14 pp.+28 l. 12mo. (London, 1729)  
Carrying power of the lodestone with numerical data. The tables are engraved on steel plates. See *Philosophical Transactions*, 1729-1730.

267. Luloffs, Johann. (1711-1768.) *De causis, propter quas zona torrida est habitabilis.* 46 pp. 4to. *Trajecti ad Rhenum, Alex. van Megen.* (Disputatio Philosophica.) *Utrecht, 1729*  
Physical conditions of the torrid zone.  
—See also 275.

268. Musschenbroek, Pieter van. (1692-1761.) *Physicae experimentales, et geometricae de magnete, tuborum capillarium vitreorumque speculorum attractione, magnetudine terrae, cohaerentia corporum firmorum dissertationes ut et ephemerides meteorologicae ultrajectinae.* 51.+685 pp. 28 plates and meteorological diary, 1 table, 4to, and charts. *Lugduni Batavorum, apud Samuelem Luchtmans.* *Leyden, 1729*  
Numerical data on the laws and phenomena of magnetism. Law of distance, p. 20; action of flames, p. 70; whirling magnet, p. 116; consequent poles, p. 243; declination at Paris and London, p. 150; dip, p. 206. Contains Halley's chart of magnetic lines.  
—See also 257.

269. Wishoff, Coenraedt. (— — .) *De wonderwerken Godts.* 1 page. 1 plate. Folio. *Leyden (No. 17).* *Leyden, 1729*  
Note on a phenomenon resembling the aurora borealis.

270. Allen, John. (or Alleyn). (1660(?)-1741.) *Specimina Ichnographica; or, A brief narrative of several new inventions and experiments; particularly the navigating a ship in a calm, the improvement of the engine to raise water by fire, a new method of drying malt, etc.* 44 pp. 1 plate. 4to. *London, 1730*  
printed for W. Innys. *London, 1730*  
Tubular boiler recommended for ships; propulsion of ships by *air-engines* and *steam-engines*; interesting on account of date.

271. Amort, Eusebius. (1692-1775.) *Philosophia Pollingana, in qua Summulae Logicae, Physicae, et Metaphysicae eo modo, quo in Academiis dictari solent continentur. Varia nova opuscula philosophica inseruntur.* 856 pp. ill. Folio. *Augustae Vindelicorum, sumptibus P. ac M. Veit et Joannis fratris haeredum.* *Augsburg, 1730*  
This work on logic and metaphysics contains a section on the nature of magnetic declination and dip together with tables and a rule for finding latitude by means of the declination.

CATALOGUE OF WHEELER GIFT

272.† **Doppelmayr, Johann Gabriel.** (1671-1750.) Historische Nachricht von den nuernbergischen Mathematicis und Kuenstlern, welche fast von dreyen Seculis her durch ihre Schriften und Kunst-Bemuehungen die Mathematic und mehreste Kuenste in Nuernberg vor andern trefflich befoerdert und sich um solche sehr wohl verdient gemacht zu einem gutem Exempel, und zur weitern ruehmlichen Nachahmung in zweyen Theilen an das Liecht gestellet. 10 l.+314 pp.+9 1. Folio. Nuernberg, Wonath. *Nuremberg, 1730*  
 Biographical notices of the mathematicians and artists of Nuremberg with copious notes and references. The author was a distinguished mathematician.  
 —See also 274, 311.

273. **Bouguer, (Pierre.)** (1698-1758.) *De la méthode d'observer en mer la déclinaison de la boussole.* 3 l.1+7+67 pp. 2 plates. 4to. Paris, Jombert. *Paris, 1731*  
 Prize essay of the Académie des Sciences for 1731, on the determination of magnetic declination at sea. The author was a celebrated mathematician.

274. **Doppelmayr, Johann Gabriel.** (1671-1750.) *Physica experimentalis illustrata oder Naturwissenschaft in einem kurzen Begriff.* 44 pp. 4to. Nuernberg, Joh. Fr. Ruedigers. *Nuremberg, 1731*  
 Syllabus of a course of lectures on experimental physics.  
 —See also 272.

275. **Luloffs, Johann.** (1711-1768.) *Disputatio philosophica inauguralis de Aurora Boreali.* 83 pp. 4to. Trajecti ad Rhenum, apud Alex. van Megen. *Utrecht, 1731*  
 Dissertation on the nature of polar aurorae.  
 —See also 267.

276. **Musschenbroek, Pieter van.** (1692-1761.) *Tentamina experimentorum naturalium captorum in Accademia del Cimento et ab ejus Academiae secretario conscriptorum ex italicis in latinum conversa, quibus commentarios, nova experimenta, et orationem de methodo instituendi experimenta physica addidit.* 8 l.+xlviii+6 l.+193+192 pp.+7 l. 32 plates. 1. 4to. Lugduni Batavorum, apud Joan. et Herm. Verbeek. *Leyden, 1731*  
 Screening action of iron, p. 74; magnetic force transmitted through liquids, p. 75; experiments with rubbed amber, p. 81; discharging property of flames, p. 87.  
 —See also 257.

277. **Ode, Jacob.** (1698-1751.) *Oratio de naturali Jobi amicorumque ejus ac ipsius Dei philosophia, observationibus quibusdam illustrata.* 60 pp. 4to. Trajecti ad Rhenum. (Inaugural dissertation.) *Utrecht, 1731*  
 Discourse on the philosophy of Job and his friends.  
 —See also 254.

CATALOGUE OF WHEELER GIFT

278. **Reibelt**, Johannes Joseph Adam. (— — —.) *De physicis et pragmaticis magnetis mysteriis; publice exposita praeside J. Handel.* 2 parts. 13 plates. 4to. *Herbipoli.*

*Wurzburg, 1731*

Cartesian doctrine refuted, p. 20; difference between electric and magnetic attraction, p. 26; author's theory, p. 29; declination and dip, p. 77; magnetic communication denied, p. 95; how magnets may be weakened and how strengthened, p. 101; mariner's compass, Part ii. See plates.

279.\* **Meynier**. (*Ingénieur du Roi pour la Marine.*) (— — —.) *Mémoire sur le sujet du prix proposé par l'Académie Royale des Sciences en l'année 1729, touchant la meilleure méthode d'observer sur mer la déclinaison de l'aiguille aimantée, ou la variation de la boussole.* xxiv+96 pp. 4 plates. 4to. *Paris, Jacques Guerin.*

*Paris, 1732*

Compass provided with "sights" for observing the bearing of a star, in order to determine magnetic declination.

280. **Bacon**, Roger. (1214-1294.) *Opus majus, ad Clementem Quartum Pontificem Romanum. Ex MS. Codice Dubliniensi cum aliis quibusdam collato nunc primum edidit S. Jebb, M.D. Londini.* 15 l.+477 pp.+2 l. tab. Folio. *Londini, typis Guilielmi Bowyer.*

*London, 1733*

On page 445 of this encyclopaedic work of the great Franciscan monk will be found remarkable statements on the importance of observation and experiment for the advancement of learning. The work was written about 1265 and first printed in 1733. Friar Bacon is often called the Apostle of Experimental Science.

—See also 1437.

281. **Comrie**, Alexander. (1708-1774.) *De moralitatis fundamento et natura virtutis.* 17 pp. 4to. *Lugduni Batavorum.* (Inaugural dissertation.)

*Leyden, 1734*

Metaphysical dissertation presented for an academical distinction.

282. (**Marana**, John Paul.) (1642-1693.) *Letters writ by a Turkish Spy, who liv'd five and forty years undiscover'd at Paris: giving an impartial account to the Divan at Constantinople of the most remarkable transactions of Europe and discovering several intrigues and secrets of the Christian courts (especially of that of France) from 1637 to 1682.* Written originally in Arabick, translated into Italian (or rather written in Italian by G. P. Marana) from thence into English (by W. Bradshaw?) and now published with a large historical preface and index (by Dr. R. Midgley?). The eight volumes of letters writ by a Turkish Spy \* \* \* to illustrate the whole 8 vols. (Vol. i., 22nd edition; vols. 2 to 8, 10th edition.) 12mo. *London, for Straham.*

*London, 1734*

The author of this celebrated work was born in Geneva in 1642. Vol. i., the sympathetic telegraph, p. 116; Vol. ii., appreciation of Descartes and his philosophy, p. 26.

CATALOGUE OF WHEELER GIFT

282a.— —A continuation of letters written by a Turkish spy, continued from 1687-1693. Originally in Arabick, translated into Italian and from thence into English. 1 vol. 12mo. London, for W. Taylor. *London, 1718*

283. **Swedenborg, Emanuel.** (1688-1772.) *Opera philosophica et mineralia.* 3 vols. (Contents: Vol. i. *Principia rerum naturalium sive novorum tentaminum phaenomena mundi.* Vol. ii. *Regnum subterraneum sive minerale de cupro et orichalco.* Vol. iii. *Regnum subterraneum sive minerale de ferro.*) pl. portr. Folio. Dresdae et Lipsiae, sumptibus Friderici Hekelii. *Dresden & Leipzig, 1734*  
This is the author's famous work on science. Vol. i. contains 250 pages of printed matter with diagrams and illustrations on the causes and mechanism of magnetic force; the law of distance; magnetic declination, its causes and how its value may be calculated. Among Swedenborg's unpublished MSS. is a treatise on the magnet, 265 pp. text and 34 pp. tables, which according to the title page he intended to publish in London in 1722. Swedenborg regarded light and heat as *undulations* in the ether of space.

284. **Gellibrand, (Henry) (1597-1636), (Richard) Norwood (1590 (?)-1675) and (William) Jones (1675 (?) -1749.)** *Epitome of Navigation.* --- First written by Gellibrand, Norwood and Jones, and now collected and digested into one compendium of navigation. 21.+160 pp., 3 plates. 12mo. London, for W. Mount. *London, 1735*  
Determination of magnetic declination, and discovery of the secular variation of that element. Gellibrand was Professor of Mathematics in Gresham College, London. The above copy was owned by Thomas Hayward, of Liverpool, who added many MSS. notes.  
—See also 109, 251.

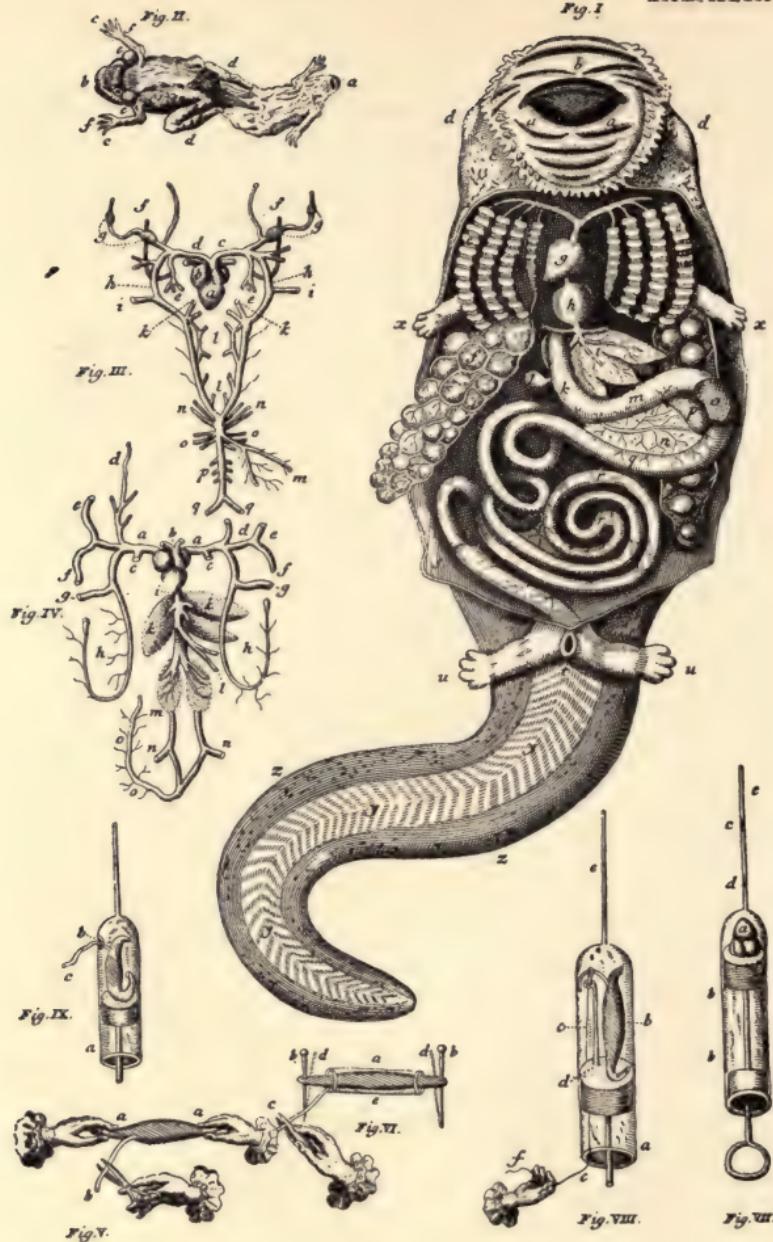
285. **Table of logarithms,** for numbers increasing in their natural order from a unit to 10,000 with a table of artificial sines, tangents and secants, the radius 10,000,000. The third edition corrected. 74 l. 12mo. London, for W. Mount. *London, 1735*  
Interesting on account of date of publication; the first table of common logarithms was published by Briggs in 1624.

286. **Bailey, N(athan) (or Nathaniel).** ( ? -1742.) *Dictionarium Britannicum; or, A more compleat universal etymological English dictionary than any extant.* Second edition, with numerous additions. By N. B. assisted by C. Gordon, P. Miller, and T. Lediard. ill. Folio. London, for T. Cox. *London, 1736*  
Articles on electricity, gagates, lyncurium, magnet, barometer.

287. **Du Halde, Jean Baptiste.** (1674-1743.) *Description géographique, historique, chronologique, politique, et physique de l'empire de la Chine et de la Tartarie chinoise enrichie des cartes générales et particulières de ces pays, de la carte générale et des*



283. SWEDENBORG. *Portrait of Author.*



291. SWAMMERDAM. (Reduced.)

CATALOGUE OF WHEELER GIFT

cartes particulières du Thibet, et de la Corée & ornée d'un grand nombre de figures & de vignettes gravées en taille-douce. Avec un avertissement préliminaire, où l'on rend compte des principales améliorations, qui ont été faites dans cette nouvelle édition. 4 vols., plates, and maps. 4to. A la Haye, Henri Scheurleer.

*The Hague, 1736*

Vol. i., p. 270 of this celebrated work of the French Jesuit on the history of China, contains an allusion to a chariot provided with a magnet for the purpose of determining the cardinal points. The first edition appeared in 1735.

287a.—(English translation.) The general history of China. Containing a geographical, historical, chronological, political and physical description of the empire of China, Chinese-Tartary, Corea and Tibet. Including an exact and particular account of their customs, manners, ceremonies, religion, arts and sciences. Done from the French of Père du Halde (by Richard Brookes). 4 vols. 4 maps and 15 plates, portr. 8vo. London, John Watts.

*London, 1736*

288. **Aken**, Pieter van. (— — —.) *De coronis et parhelis.* 45 pp. 4to. Trajecti ad Rhenum, A. van Megen. (Inaugural dissertation.)

*Utrecht, 1736*

Nature of parhelia and other circumsolar phenomena.

289. **Herwerden**, Johannes van. (1713-1772.) *De motu terrae diurno atque annuo.* 48 pp. 1 plate. 4to. Trajecti ad Rhenum. A. van Megen. (Inaugural dissertation.)

*Utrecht, 1736*

Thesis on the diurnal and annual motion of the earth.

290. **Heyning**, Gerard van. (— — —.) *De mente humana.* 73 pp. 4to. Trajecti ad Rhenum. (Inaugural dissertation.)

*Utrecht, 1736*

Dissertation on the human mind.

291. **Swammerdam**, Jan. (1637-1680.) *Biblia naturae; sive historia insectorum in classes certas redacta, necnon exemplis et anatomico variorum animalculorum examine aeneisque tabulis illustrata, insertis numerosis rariorum naturae observationibus. Accedit praefatio, in qua vitam auctoris descripsit Hermannus Boerhave. Latinam versionem adscripsit Hieronimus David Gaubius.* Dutch and Latin. 2 vols. 52 plates. Folio, Leydae, apud Isaacum Severinum.

*Leyden, 1737-1738*

This is the celebrated folio work on entomology of the great Dutch naturalist which was published fifty-seven years after his death. On p. 839, experiments on frog's legs are described in which the author obtained in 1658 muscular contractions by using silver and copper wires. This was more than a century before Galvani's experiments of a similar nature. The work is printed in parallel columns in Dutch and in Latin. The plates are of great interest.

CATALOGUE OF WHEELER GIFT

292. **Hadley, John.** (1682-1744.) A description of a new instrument for taking the latitude or other altitudes at sea. 30 pp. + 1 l. 1 plate. 12mo. London. *London, 1738*  
Description and use of the author's *Quadrant*. Franklin in his *Autobiography* attributes the invention of the *quadrant* to Thomas Godfrey, a mathematician of Philadelphia.

293. **Pointer, John.** (1668-1754.) A rational account of the weather, shewing the signs of its several changes and alterations, together with the philosophical reasons of them, to which are added, three essays towards accounting for: i. A continued course of wet years. ii. The cause of an aurora borealis. iii. The cause of the plague. Second edition, corrected and much enlarged. 224 pp. 8vo. London, for A. Ward. *London, 1738*  
Meteorology in poetry; signs of thunder and lightning, p. 105; the "weather glass," p. 141; the aurora borealis, pp. 171-204.

294. **Poleni, Giovanni.** (1683-1761.) Sopra l'aurora boreale, comparsa il di 16. Dicembre, 1737. 28 pp. 4to. Venezia, P. Bassaglia. *Venice, 1738*  
Description of the aurora borealis as seen in Padua and Bologna, Dec. 16, 1737, with remarks on the nature of the phenomenon.

295. **Squario, Eusebio.** (also Sguario.) (— — —) Dissertazione sopra le aurore boreali. 120 pp. 2 plates. 4to. Venezia, P. Bassaglia. *Venice, 1738*  
Mathematical and physical dissertation on the aurora borealis. The author is said to have been the earliest writer on electricity in Italy.  
—See also 336.

296. **Goens, Daniel van.** (— — —.) An luna habitabilis sit. 23 pp. 4to. Trajecti ad Rhenum. A. van Megen. (Inaugural dissertation.) *Utrecht, 1738*  
Dissertation on the habitability of the moon.

297. **Helsham, Richard.** (1680-1738.) Course of lectures in natural philosophy, published by Bryan Robinson. viii+404 pp. + 2 l. 11 plates. 8vo. London, printed for John Nourse. *London, 1739*  
First edition of a frequently reprinted work.

298. **Keill, John.** (1671-1721.) Introductiones ad veram physicam et veram astronomiam quibus accedunt trigonometria, de viribus centralibus, de legibus attractionis editio novissima. 2 l. + 636 pp. + 5 l. 48 plates. 4to. Lugduni Batavorum, apud Joh. et Herm. Verbeck. *Leyden, 1739*  
Magnetic qualities of a steel bar destroyed by fire and also by a severe blow, p. 85; electric attraction due to effluvia, p. 635. Defense of Newton against Leibnitz; Keill was an able mathematician.

299. **Mannevillette, (Jean Baptiste Nicolas Denis D'Après de), (also Après de Mannevillette).** (1707-1780.) Le nouveau quartier anglois, ou description et usage d'un nouvel instru-

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ment pour observer la latitude sur mer. 1 l.+43 pp.+1 l. 2 plates. 12mo. Paris. *Paris, 1739*

The "quartier" described here is Hadley's *Quadrant*; the author was a distinguished hydrographer.

300. **Musschenbroek**, Pieter van. (1692-1761.) Essai de physique avec une description de nouvelles sortes de machines pneumatiques, et un Recueil d'expériences par Mr. J(an) V(an) M(usschenbroek), traduit du Hollandois par Pierre Massuet. 2 vols. 914 pp.+15 l.+8+63 pp. 33 plates. 4to. Leyden, Luchtmans. *Leyden, 1739*

Electric bodies, p. 254; law of magnetic attraction, p. 277; air-pump with experiments.

301.——Description de nouvelles sortes de machines pneumatiques, tant doubles, que simples, avec un recueil de plusieurs expériences par J(ean) V(an) M(usschenbroek) que l'on peut faire avec ces machines. 63 pp. pl. 4to. Leyden, S. Luchtmans. *Leyden, 1739*

302.——Liste de diverses machines, de physique, de mathématique, et de chirurgie, qui se trouvent chez Jean van Musschenbroek à Leyden. 8 pp. 4to. Leyden, S. Luchtmans.

*Leyden, 1739*

List of physical and surgical apparatus.

—See also 257.

303. **Mortenson**, Johannes. (— — —.) *Dissertatio physica de electricitate. Praeses Samuel Klingensierna.* 2 l.+22 pp.+2 l.+ pp. 24-56+1 l. Sm. 4to. Upsaliae. *Upsala, 1740-1742*

Short treatise on electricity: the electric spark, p. 46. Stated to be the first *separately* printed treatise on electricity.

304. **Ozanam**, (Jacques). (1640-1717.) Récréations mathématiques et physiques, qui contiennent plusieurs problèmes d'arithmétique, de géometrie, de musique, d'optique, de gnomonique, de cosmographie, de mécanique, de pyrotechnie, et de physique, avec un traité des horloges élémentaires. Nouvelle édition, augmentée. 4 vols. 134 plates. 12mo. Paris, Charles-Antoine Jombert. *Paris, 1741*

The first edition of this celebrated work on recreative philosophy was published in 1696. Vol. iii. contains a chapter on the magnet, p. 234. Artificial frog floating in a basin of water and indicating the hours, p. 236; white, red and blue lodestones, p. 243; the *theamedes* or repelling stone, p. 244; iron filings in glass tube, p. 245; declination and dip, p. 245; table of magnetic declination at Paris, p. 255; numerous plates.

304a.——Another edition. Vol. iii. 10 plates. 8vo. Paris, Jacques Rollin. *Paris, 1750*

304b.——(English translation). Recreations in mathematics and natural philosophy. First composed by M. Ozanam; lately recomposéd and greatly enlarged in a new edition by M.

A

# DISSERTATION

CONCERNING

## *ELECTRICITY.*

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By *J. DESAGULIERS, LL.D. F.R.S.*

Chaplain to His ROYAL HIGHNESS  
the PRINCE of WALES.

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To which is Annex'd;

A Letter from President *BARBOT*  
perpetual Secretary of the Academy of  
*Bordeaux*, to acquaint him that his Disser-  
tation had won the Prize proposed by that  
Academy to be given to the Person who  
should write best upon that Subject.

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*L O N D O N :*

Printed for *W. INNYS, and T. LONGMAN,*  
*M. DCC. XLII.*

306. *DESAGULIERS. (Reduced.)*

CATALOGUE OF WHEELER GIFT

Montucla and now translated into English by Charles Hutton.  
Vol. iv. 8vo.

*London, 1803*

Montucla is the celebrated French historian of mathematics.

304c.—Recreations in science and natural philosophy: Dr. Hutton's translation of Montucla's edition of Ozanam. The present edition is revised by Edward Riddle, who has corrected it to the present era, and made numerous additions. xiv+826 pp. 8vo.

*London, 1840*

305. (Belgrado, Giacomo). (1704-1789.) Hydrostaticae disciplinae propositiones a Joanne Calvio. 4+32 pp. 4to. Parmae, J. Rosati.

*Parma, 1742*

Historical and critical tract on the principles of hydrostatics.

—See also 376.

306. Desaguliers, Jean Théophile. (1683-1744.) A dissertation concerning electricity; to which is annex'd a letter from President Barbot. 3 l.+48 pp.+1 l. 12mo. London, for W. Innys and T. Longman.

*London, 1742*

Friction imparts vibratory motion and causes emission of effluvia, p. 2; Du Fay shows how to recognize the two electrical states called by him the vitreous and resinous, p. 33; Hauksbee's electric glow, p. 40. Desaguliers was an eminent physicist and Fellow of the Royal Society; the earliest English work *entirely* on electricity, if the tract by Boyle (See No. 178) is excepted.

—See also 249.

307. Dodson, James. (? -1757.) The anti-logarithmic canon, being a table of numbers, consisting of eleven places of figures, corresponding to all logarithms under 100,000; to which is prefix'd an introduction, containing a short account of logarithms. x+84 pp.+tables+2 l. Folio. London, for James Dodson.

*London, 1742*

The introduction contains historical notes on the subject. This is one of the earliest tables of anti-logarithms or numbers corresponding to logarithms.

308. Académie des Sciences, Paris. Philosophical history and memoirs of the Royal Academy of Sciences; or, An abridgement of all the papers relating to natural philosophy which have been publish'd by the members of that society; from the year 1699-1720; the whole translated and abridged by John Martyn and Ephraim Chambers. Vols. i-iv (complete in 5 vols). 35 plates. 8vo. London, for John and Paul Knapton.

*London, 1742*

Vol. i., amber, p. 186; Galvani's experiment anticipated, p. 187; magnetic declination, p. 207; Vol. iii., luminous barometer, p. 23. The Library contains a set, unabridged, of the *Histoire* and *Mémoires*, of the Académie des Sciences, 1666-1778, 166 vols. (See Section X.)

309. Hausen, Christian August. (1693-1743.) Novi profectus in historia electricitatis post obitum auctoris, ex MSS. ejus editi. Praemissa est commentatiuncula de vita et scriptis viri (by J. C. G. P. P., with a dedicatory epistle by F. J.

CATALOGUE OF WHEELER GIFT

Hausen). 3 l.+xii+49 pp.+1 l. 1 plate, 4to. Lipsiae, apud Theodorum Schwan. *Leipzig, 1743*

The electric field is said to be due to vortices of electric matter, p. 5. Three kinds of electric light recognized: the spark, pp. 8, 9, 42; the brush, pp. 15, 45; the glow, pp. 17, 45; the three kinds defined, p. 7; the *ether* of Newton is identical with electrical matter, p. 46

309a.——Another edition. Accessit V. C. Henrici de Sanden, *Dissertatio de succino, electricorum principe, quam edidit et de vita B. Hausenii praefatus est Joh. Christoph Gottsched.* 8l.+128 pp. 1 plate. 12mo. Lipsiae, T. Schwan. *Leipzig, 1746*

Some experiments which are considered by the author as fundamental and explained by him on the theory of electrical vortices.

310. **Bose**, Georg Mathias. (1710-1761.) *Tentamina electrica in Academiis regiis Londiniensi et Parisiana primum habita, omni studio repetita et novis aliquot accessionibus locupletavit. Tentamina Electrica, tandem aliquando hydraulicae chymicae et vegetabilibus utilia. Pars posterior.* vi+96 pp.+4l.+xlviii pp. 4to. Wittembergae, Jo. Joach. Ahlfeld.

*Wittenberg, 1744-1747*

Appreciation of the work of Gilbert, Newton, Hauksbee, Du Fay and others: the electrical siphon, effect of electricity on plants, no change in weight due to electrification. Bose (Boze) is said to have added the *prime-conductor* to the electrical machine as Winkler is said to have substituted a *fixed rubber* for the hand of the operator.

311. **Doppelmayr**, Johann Gabriel. (1671-1750.) *Neuentdeckte Phaenomena bey der fast allen Coerpern zukommenden electrischen Kraft und des dabei erscheinenden Liecht.* 6+88 pp. 5 plates. 4to. Nuernberg, W. M. Endterisch und Engelbrecht.

*Nuremberg, 1744*

Electrical experiments taken from Hauksbee, Gray and Du Fay with numerous references to original papers.

—See also 272.

312. **Musschenbroek**, Pieter van. (1692-1761) *Elements of natural philosophy.* Translated from the Latin by John Colson. 2 vols. 26 plates. 8vo. London, for Nourse. *London, 1744*

Effect of weather on electrified bodies, p. 188; electrified bodies in *vacuo*, p. 189; electrical screening, p. 189; field due to excited string, p. 190; attraction mutual, p. 191; experiments on child suspended by silken cords, p. 153; vitreous and resinous electricity, p. 195; electric effluvia move in vortices, p. 196; the magnet, p. 205; law of distance, p. 205; field mapped out by filings, p. 210.

312a.——(Latin edition.) *Institutiones physicae conscriptae in usus academicos.* 5 l.+743 pp. 1 map, 28 plates. 8vo. Lugduni Batavorum, apud Samuelem Luchtmans. *Leyden, 1748*

312b.——*Elementa physicae.* Editio altera Neapolitana. Vol. i. 11. plates. 12mo. Neapoli typis Benedicti. *Naples, 1751*

Electric bodies, p. 305; the Leyden experiment, p. 307; the magnet, p. 323.

CATALOGUE OF WHEELER GIFT

312c.— —Introductio ad philosophiam naturalem. Editio prima Italica. 2 vols. 56 plates. 4to. Patavii, apud Joannem Manfré. *Patavia, 1768*

Vol. i. contains a chapter on electricity, and another on the magnet. Electrification of tourmaline, p. 290; animal electricity (the torpedo), p. 294; electricity and magnetism compared, p. 345; magnetic declination, p. 360.  
—See also 257.

313. Winkler, Johann Heinrich. (also Winckler.) (1703-1770.) Gedanken von den Eigenschaften, Wirkungen und Ursachen der Electricitaet, nebst einer Beschreibung zwey neuer elektrischen Maschinen. 16+168 pp. 3 plates. 12mo. Leipzig, Bernhard Christoph Breitkopf. *Leipzig, 1744*

Properties, effects and causes of electricity; two new frictional machines, pp. 10, 18; size of *leather cushion*, p. 21; velocity of electric transmission, p. 70; effect of magnet on electric sparks, p. 63.

313a.— —(Dutch translation.) Nieuwe naturkundige ontdekkingen aangaande de eigenschappen, werkingen, en oorzaaken der electriciteyt, benevens een beschryvinge van twee nieuwe electrische werktuigen: ut het Hoogduitsch vertaald. 8 1.+119 pp. 4 plates. 8vo. Amsterdam, Hendrik Vieroot. *Amsterdam, 1745*

Two new electric machines, p. 5; rubber substituted for hand, p. 10; velocity of electric propagation, p. 48; lines of force, p. 54; charged body surrounded by an electric atmosphere, p. 71.

313b.— —Another edition. 2 parts. 10 plates. 8vo. Amsterdam, H. W. van Welbergen. *Amsterdam, 1751*

The first part treats of the properties and causes of electric phenomena; the second, investigates the qualities of electric matter and electric fire.

313c.— —(French translation). Essai sur la nature, les effets, et les causes de l'électricité, avec une description de deux nouvelles machines à électricité. Traduit de l'Allemand. 6 1.+156 pp. 2 plates. 12mo. Paris, Sebastian Jorry. *Paris, 1748*

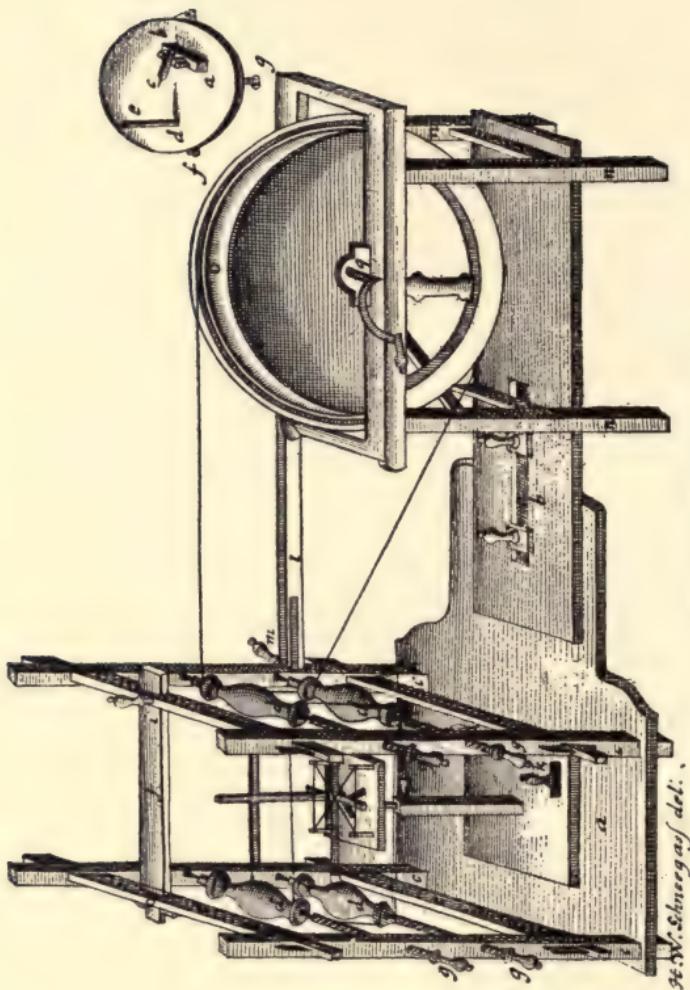
314.— —Grundriss zu einer ausfuehrlichen Abhandlung von der Electricitaet. 16 pp. 12mo. Leipzig, Bernhard Christoph Breitkopf. *Leipzig, 1744*

Outline of a treatise on electricity.

—See also 323, 335.

315†. Baddam, (Benjamin). (— — —.) Memoirs of the Royal Society; or, a New abridgment of the Philosophical Transactions, 1665-1740, carefully extracted from the originals, according to the order of time; the Latin tracts are Englished. Second edition. Vols. 1-5, 8, 9. (Complete in 10 vols.) 8vo. London, Nourse. *London, 1745*

The preface contains a short, general account of the Philosophical Transactions. Vols. 3 & 4 belong to the first edition, 1739. The Library contains a complete set of the *Philosophical Transactions* unabridged, 1665 to date, the gift of Mr. Edward P. Adams. (See Section X.)



313. WINKLER. (Reduced.)

H. V. Schenck & del.

CATALOGUE OF WHEELER GIFT

316. **Du Fay**, Charles Francois de Cisternay. (also Cisternay Dufay.) (1698-1739.) Versuche und Abhandlungen von der Electricitaet, derer Coerper. Aus dem Franzoesischen ins Deutsche uebersetzt. 7 l.+xxiv+311 pp.+8 l. 12mo. Erfurth, Johann Friedrich Webern. *Erfurt, 1745*  
 Translation of papers by Du Fay on electricity communicated to the Academie des Sciences, in 1733-1734, preceded by a sketch of the author's life. The author describes experiments which led him to his theory of vitreous and resinous electrifications.

317. **Gordon**, Andreas. (1712-1751.) Versuch einer Erklaerung der Electricitaet. 5 pp.+3 l.+88 pp. 2 plates. 12mo. Erfurt, Johann Heinr. Nonne. *Erfurt, 1745*  
 Gordon's electrical machine, p. 6; invents the familiar device known as the electric chimes, p. 38; makes an electric *reaction-motor*, p. 45; speculates on the causes of electrical phenomena, p. 64. The author, a Scotchman, was a Benedictine monk, Professor of Natural Philosophy in the University of Erfurt. Gordon's chimes date from 1745; Franklin's, 1752.

317a.——Second edition. Mit neuen Versuchen und Instrumenten vermehret. Nebst einer neuen Vorrede von dem Nutzen der Electricitaet. 112 pp. 1 plate. 8vo. Erfurt, Joh. Heinr. Nonne. *Erfurt, 1746*  
 Glass *globe* replaced by glass *cylinder*, plate i.; electric chimes, p. 47; an electric motor, p. 57; experiments on the velocity of electric transmission, p. 72.  
 —See also 368.

318. **Krueger**, Johann Gottlob. (1715-1759.) Zuschrift an seine Zuhörer worinnen er ihnen seine Gedancken von der Electricitaet mittheilet und ihnen zugleich seine kuenftige Lecctionen bekant macht. 56 pp.+1 l. 2 plates. 12mo. Halle, Carl Herrmann Hemmerde. *Halle, 1745*  
 Heat insufficient for electrification, friction required, p. 16; theory of electrical atmospheres refuted, p. 17; electric odor, p. 35; effect of electricity on the body, p. 43; electricity in medicine, p. 46.

319. **Nollet**, Jean Antoine. (1700-1770.) Leçons de physique expérimentale. 2 ème édition. 6 vols. pl. 12mo. Paris, Guerin. *Paris, 1745-1748*  
 Extensive treatise on physics. First edition, 1743. Vol. iv., uncertainty about the identity of lightning and artificial electricity, p. 314; nature of electricity, vol. vi, p. 407. Abbé Nollet was pronouncedly anti-Franklinian in his views.

319a.——(English Translation.) Lectures on experimental philosophy. Translated from the French by John Colson. xlviii+278 pp. 18 plates. 8vo. London, S. Austin. *London, 1748*  
 —See also 329, 346, 355, 379, 430.

320. **Psellus**, (Michael Constantine). (1020-1110.) De lapidum virtutibus, Graece ac Latine cum notis Phil. Jac. Maussaci et Joan. Steph. Bernard. Accedit fragmentum de colore sanguini.



*De la Tour Pez.*

*Meiss. Sculp. 1771.*

319. *NOLLET.* (See No. 4377.)

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nis ex doctrina medica Persarum nunc primum ex codice MS. Bibliothecae Lugduno-Batavae editum. Graece et Latine. 6 l.+164 pp.+3 l. 12mo. Lugduni Batavorum, apud Philippum Bonk.

Leyden, 1745

The author was born in Constantinople in 1020 and was considered one of the best scholars of his time. The Latin translation which accompanies the Greek text is by Philippe Jacques de Maussac (1590). *Lyncurium*, p. 23; *electrum*, p. 15; attracting and *repelling* magnets, p. 25.

321. **Vorster**, Antoine. (1706-1793.) *Tractatus de motionibus magneticis ex operibus Francisci Tertii de Lanis*, S. J. 3 l.+86 pp +3 l. 8vo. Graecii, typis Haeredum Widmanstadii.

Gratz, 1745

Magnetic spirits (steams) flow through the pores of a magnet from pole to pole; secular variation is due to change in the position of the earth's magnetic pole. This is part ii. of the "Tractatus;" the first part containing 106 pages appeared in 1744.

—See also 166.

322. **Waitz, J(jacob) (Sigismund)**. (1698-1777.) *Abhandlung von der Electricitaet und deren Ursachen*. (Zweite Abhandlung von der Natur der Electricitaet. Dritte Abhandlung von den Eigenschaften, Wirkungen and Ursachen der Electricitaet.) 237 pp. 4 plates. Sm. 4to. Berlin, A. Haude.

Berlin, 1745

Three short treatises on the nature and effects of electricity.

322a.——(Dutch translation). *Over Electriciteit en derzelver Orzaaken*. 140 pp. 4 plates. 8vo. Amsterdam, Hendrik Vieroot.

Amsterdam, 1751

323. **Winkler, Johann Heinrich**. (also Winckler.) (1703-1770.) *Die Eigenschaften der electrischen Materie und des electrischen Feuers, aus verschiedenen neuen Versuchen erklaeret und nebst etlichen neuen Maschinen zum electrisieren beschrieben*. 14 l.+164 pp. 12mo. Leipzig, Bernhard Christoph Breitkopf.

Leipzig, 1745

Chap. i. treats of the mutual effect of two electrified bodies; chap. ii., of what occurs when a neutral body is brought near one that is electrified; electrical nature of thunderstorm; reference to *von Kleist's* discovery of the *Leyden jar*, p. 43.

323a.——(Dutch translation). *De eigenschappen der elektrische stoffen*. 8 l.+110 pp. 4 plates. 8vo. Amsterdam, Hendrik Vieroot.

Amsterdam, 1746

—See also 313.

324. **Istituto delle Scienze ed Arti Liberali**, Bologna. *De Bononiensi scientiarum et artium institutio atque Academia commentarii*. (Edited by F. M. Zanotti). Years 1745-1748. 2 vols. in 4. 4to. Bononiae.

Bologna, 1745-1748

Description of polar aurorae, vol. i., p. 294; also vol. ii., part i., p. 474; Vol. ii., part 3, contains a lengthy paper on the invention of the mariner's compass.

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325. **Freke, John.** (1662-1744.) An essay to shew the cause of electricity, and why some things are non-electricable; in a letter to M. William Watson. Second edition. With appendix viii+64 pp. 12mo. London, for W. Innys. *London, 1746*  
Electric matter considered to be the same nature as fire; identity of lightning and electricity recognized, p. 29. (See No. 328.)  
—See also 371.

326. **Kratzenstein, Christian Gottlieb.** (1723-1795.) *Theoria electricitatis more geometrico explicata.* 62 pp. 1 plate. 4to. Hala, Magdeb, Hemmerde. *Halle, 1746*  
Series of demonstrations and corollaries in electrostatics.  
—See also 436.

327. **Martin, Benj(amin).** (1704-1782.) An essay on electricity, being an enquiry into the nature, cause and properties thereof, on the principles of Sir Isaac Newton's theory of vibrating motion, light and fire; and the various phenomena of forty-two capital experiments, with some observations relative to the uses that may be made of this wonderful power of nature. 40 pp. 12mo. Bath, for the author. *Bath, 1746*  
Electricity is regarded as a kind of subtle matter, the various phenomena being produced by its vibrations; analogy between lightning and electricity, p. 19.

328.——A supplement (to An essay on Electricity) containing remarks on a rhapsody of adventures of a modern knight-errant (i.e. John Freke) in philosophy. 38 pp. 12mo. Bath, for the author. *Bath, 1746*  
Attack on Freke's essay on "The Cause of Electricity." (See No. 325.)  
—See also 342, 398, 411, 608.

329. **Nollet, Jean Antoine.** (1700-1770.) *Essai sur l'électricité des corps.* xx pp.+2 1.+227 pp. 5 plates. 12mo. Paris, Guerin. *Paris, 1746*  
Abbé Nollet, friend of Du Fay and Réaumur, was Professor of Experimental Philosophy in the Collège de Navarre. Electric matter is either affluent or effluent, pp. 107, 136, 160; Du Fay's distinction of vitreous and resinous electricity discarded, p. 118; 1256 feet of hempen cord electrified by excited glass tube, p. 111; electric brushes, pp. 136, 160; van Musschenbroek's Leyden phial experiment, p. 133.

329a.——Third edition. xxiii+273 pp.+1 1. 5 plates. 12mo. Paris, H. L. Guerin & L. F. Delatour. *Paris, 1754*  
—See also 319.

330. **Soedgren, Olaus.** (— — —.) *De recentioribus quibusdam in electricitate detectis.* 16 pp. 4to. Upsaliae. (Inaugural dissertation.) *Upsala, 1746*  
An academical dissertation on some electrical discoveries that attracted much attention at the time.

331. **Theophrastus, (Eresius.)** (373-288 B. C.) History of stones, with an English version and critical and philosophical notes by John Hill; to which are added two letters, one to Dr.

Lightning from hence may in some measure be accounted for ; though I cannot so exactly tell what collects it together, as I can in this factitious Lightning here treated of, yet I can suppose, that the Cause of Lightning is produc'd from a great Quantity of this Fire before spoken of ; which being driven together, and included in a limited State, or Covering of some Kind, when discharged from this Covering, it goes off in an Explosion, which is Thunder. The Lightning I need not describe, being intirely the same with Electricity ; for it will kill without a Wound, and pass through every thing, as this seems to do.

I am to shew, first, the Cause of its kindling a Flame in certain compounded Liquors ; which, if what I have supposed be true, that it is by the means spoken of that this Fire is collected

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James Parsons, On the colours of the sapphire and turquoise, and the other to Martin Folkes, Upon the effects of different menstruum on copper. With a Greek and English index. xxiii+211 pp. 8vo. London, for G. Davis. *London, 1746*  
The Greek text is accompanied by a literal translation. Lengthy notes on the lyncurian stone, p. 73; amber, p. 79; the magnet-gem, p. 105. Theophrastus was the favorite pupil of Aristotle.

—See also 120a, 125.

332. Turner, R(obert). (— — .) Electricology; or A discourse upon electricity, being an enquiry into the nature, causes, properties, and effects thereof, upon the principles of the aether. 42 pp. 8vo. Worcester, for the author. *Worcester, 1746*  
Experiments made at a distance of "one hundred feet from the machine" and explained by the elasticity and transparency of the ether. The *sensitive plant*, p. 25; the *torpedo*, p. 26; lightning and electricity identical, p. 34; shock localized for curative purposes, p. 39.

333. Watson, (Sir) William. (1715-1789.) Experiments and observations tending to illustrate the nature and properties of electricity in one letter to Martin Folkes and two to the Royal Society. With continuation and preface. Third edition. viii+59 pp. 1 plate. 8vo. London, for C. Davis. *London, 1746*  
Numerous original experiments. Spirits of wine ignited by electricity, p. 20; gunpowder fired, p. 40; electric wind, crackling noise, p. 46; a vacuum has no influence on electrical attractions and repulsions, p. 46; rectilinear propagation of electricity, p. 50. (See Nos. 2308, 3495.)

333a.— —Third edition. 32 pp. 8vo. Dublin, George Alex. Ewing. *Dublin, 1746*

333b.— —Sequel to the experiments and observations tending to illustrate the nature and properties of electricity, wherein it is presumed by a series of experiments expressly for the purpose, that the source of the electrical power and its manner of acting are demonstrated. Addressed to the Royal Society. 11+80 pp. 1 plate. 8vo. London, for C. Davis. *London, 1746*  
Iron filings and *mercury* used for inner coating of Leyden jar, p. 13; electric (Leyden) circuit, p. 26; small bells rung by electricity, p. 56; electric ether more subtle than air, p. 50. (See No. 351.)  
—See also 352, 410.

334. Wilson, Benjamin. (1708-1788.) Essay towards an explication of the phaenomena of electricity deduced from the aether of Sir Isaac Newton, contained in three papers, which were read before the Royal Society. xv+95 pp. 8vo. London, for C. Davis. *London, 1746*  
The chief agent in electrical phenomena is the ether which is the same as *electrical matter*. This exists in all bodies and is more subtle than air, p. 2; Leyden jar with coatings of water, p. 25; any particular part of the body may receive a shock, p. 25; *sheet lead* used for outer coating, p. 81.  
—See also 362, 397, 446, 478, 2474.

very fine, it (as you please to make the Experiment) is either attracted, or repell'd ; so that in the first Case, the End of your Finger when electrifyed, shall be cover'd over with the Powder, though held at some Distance ; and in the other, if you electrify the Powder, it will fly off at the Approach of any non-electrifyed Substance, and sometimes even without it. But I can at Pleasure fire Gunpowder, and even discharge a Musket, by the Power of Electricity, when the Gunpowder has been ground with a little Camphor, or with a few Drops of some inflammable chemical Oil. This Oil somewhat moistens the Powder, and prevents its flying away ; the Gunpowder then being warm'd in a Spoon, the electrical Flashes fire the inflammable Vapour, which fires the Gunpowder : But the Time between the Vapour firing the Powder is so short, that frequently they appear as the same, and not successive

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335. **Winkler, Johann Heinrich.** (also Winckler.) (1703-1770.) Die Staerke der electrischen Kraft, des Wassers in glaesernen Gefaessen, welche durch den Musschenbroekischen Versuch bekannt geworden, erklaert von H. Winkler. 10 l.+164 pp. 9 plates. 12mo. Leipzig, Bernhard Christoph Breitkopf. *Leipzig, 1746*  
The Leyden jar with experiments and theory; the identity of lightning and machine electricity discussed, p. 137.  
—See also 313.

336.\* **(Squario, Eusebio.)** Dell'elettricismo o sia delle forze elettriche de'corpi svelate dalla fisica sperimentale con un' am- pia dichiarazione della luce elettrica. Aggiuntevi due dis- sertazioni attinenti all' uso medico di tali forze. xvi+391 pp. 1 plate. 8vo. Venezia, presso Gio. Battista Recurti. *Venice, 1746*  
Different ways of electrifying bodies, pp. 119, 123, 129: Amber rubbed in vacuo, p. 158; vitreous and resinous electricity, p. 186; three kinds of electric "light" (discharges), pp. 230, 275, 312. Description of a frictional machine, p. 322.  
—See also 295.

337. **Cooper, M.** Philosophical enquiry into the properties of elec- tricity, in which is contain'd a confutation of the solutions which have been hitherto given of it, and the most probable reason of the late surprising experiments, in a letter to a friend. 32 pp. 12mo. London, for M. Cooper. *London, 1746*  
The inquiry assumes that electrical attraction is caused by a material emanation from the attracting body and that repulsion is caused by the tendency of electrical effluvia to recede further and further.

338. **Carli, Gian Rinaldo.** (1720-1785.) Dissertazione intorno alla declinazione, o variazione della calamita, e bussola nautica, dal polo. xxxii pp. 1 plate. Sm. 4to. Venezia, per Benedetto Milocco. *Venice, 1747*  
History of magnetic declination, p. xi.; variation of the declination, p. xii.; marine compass made by the author, p. xxviii.

339. **Faure, Giovanni Battista.** (— — —.) Congetture fisiche in- torno alle cagioni de'fenomeni osservati in Roma nella macchina elettrica. 6 l.+140 pp.+1 l. Sm. 4to. Roma, presso il Bernabo. *Rome, 1747*  
Electric effluvia said to be of glutinous nature, p. 44; physiological effect of the Leyden jar discharge, p. 64; electric and magnetic attractions do not follow the law of the inverse square of the distance, p. 80; law of gravitation disproved, p. 95.

340. **L—tt—n, E—m—d.** (i.e. Litton, Edmund.) (— — —.) Phil- osophical conjectures on aereal influences, the probable ori- gin of diseases with an unusual cure in the scurvy, address'd to Dr. Shaw by E—m—d L—tt—n. 57 pp. 12mo. London, for T. Trye. *London, 1747*  
Electricity is mentioned in connection with the ether and with the cause of gravitation, p. 28.

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341. **Louis**, (Antoine). (1723-1792.) *Observations sur l'électricité, où l'on tâche d'expliquer son mécanisme et ses effets sur l'oeconomie animale avec des remarques sur son usage.* xxiv +175 pp. 12mo. Paris, chez Delaguette. *Paris, 1747*  
 Short exposition of the effects of electricity in general and on the human organism in particular. The author holds with Abbé Nollet that an electric charge is not limited to the surface of a conductor, p. 31; Cunaeus is considered to be the discoverer of the Leyden jar, p. 46.

342. **Martin**, B(enjamin). (1704-1782.) *Philosophia Britannica; or, A new and comprehensive system of the Newtonian philosophy, astronomy and geography in a course of twelve lectures, with notes, containing the physical, mechanical, geometrical, and experimental proofs and illustrations of all principal propositions in every branch of Natural Science.* 2 vols. 73 plates. 8vo. Reading, C. Micklewright & Co. *Reading, 1747*  
 "As Britain is the birth-place of Philosophy, so English is its vernacular tongue." Chapters on electricity, magnetism, gravitation, circular motion and pendulums.

342a.— —Supplement to the *Philosophia Britannica*, Appendix i & ii. 2 vols. Appendix i. containing new experiments in electricity, and the method of making artificial magnets. 3 plates. Appendix II containing: i. A description of a new universal compound microscope. ii. The description of a new solar microscope. iii. The description of a new glass micrometer. iv. New improvements in telescopes and microscopes by a composition of glasses. v. The description of a new reflecting telescope. vi. Of visual glasses, or the improvement of common spectacles. vii. Description of a equatorial telescope. 5 plates. 32+80 pp. 8vo. *London, 1759*  
 The aurora borealis an electrical phenomena, p. 15; Canton's method of making magnets, p. 27.  
 —See also 327.

343. **Neale**, John. (— — .) *Directions for gentlemen who have electrical machines, how to proceed in making their experiments.* 77 pp. 2 plates. 8vo. London, for the author. *London, 1747*  
 On p. 37 van Musschenbroek is said to have discovered the Leyden jar "more by accident than by design;" Dr. Bevis uses *sheet lead* for the coating of Leyden jars and finds their efficiency to be proportional to the surface covered, pp. 45, 47. Canton discharges Leyden jars by *alternate contact*, p. 49; filings used for inner coat, p. 69.

344. **The Guardian**. (By Sir R. Steele, Joseph Addison and others.) 2 vols. 8vo. *London, 1747*  
 Strada's poem on sympathetic compasses, vol. ii., p. 213. (See No. 90.)

345. **Collina**, Abbondio. (1691-1753.) *Considerazioni istoriche sopra l'origine della bussola nautica nell' Europa e nell' Asia.* xvi

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+145 pp. Sm. 4to. Faenza, presso l'Archi, impress. Vescovile. *Faenza, 1748*

Brief history of electrical discovery, p. 25; the compass among the Chinese, Arabs and Portuguese, p. 102.

346. **Ellicott, John.** (1706?-1772.) Several essays towards discovering the laws of electricity, communicated to the Royal Society and read on the 25th February, 1747, and at two meetings soon after; to which is prefix'd part of a letter from the Abbé Nollet to M(artin) Folkes. 38 pp. 4to. London.

*London, 1748*

The author explains electric phenomena by effluvia which attract all other bodies but which are mutually repellent, p. 10. This tract contains a translation of Abbé Nollet's paper on *fine streams* of electrified water, also some remarks on the influence of electricity on vegetation.

347. **Forbin, (Claude) de.** (1656-1733.) Mémoires du Comte de Forbin. (Edited by S. Reboulet and Le Comte). 2 vols. 12mo. Amsterdam, Francois Girardi. *Amsterdam, 1748*

St. Elmo's fires, vol. i., p. 368. In vol. ii., the pages treating of flaming meteors are missing.

348. **Hinton, John.** (— — —) Universal magazine of knowledge and pleasure for 1747. ill. 8vo. London, Hinton. *London, 1748*  
"Boussole" or "Bossala" derived from "box," p. 118; remarks on Abbé Nollet's experiments, pp. 119, 265.

349†. **Jallabert, L(ouis).** (1712-1768.) Expériences sur l'électricité, avec quelques conjectures sur la cause de ses effets. xii+304 pp. 3 plates. 8vo. Genève, Barrillo. *Geneva, 1748*

This comprehensive work embraces the knowledge of the time on electric phenomena and theory; it has been frequently quoted. The author considers electricity to be a subtle, elastic fluid.

349a.——Another edition. 8 l.+379 pp. 3 plates. 12mo. Paris, Durand. *Paris, 1749*

350. **Knight, G(owin).** (1713-1772.) An attempt to demonstrate, that all the phenomena in nature may be explained by two simple active principles, attraction and repulsion, wherein the attractions of Cohesion, Gravity and Magnetism are shown to be one and the same: and the phenomena of the latter are more particularly explained. 1 l.+95 pp. 4to. London.

*London, 1748*

The attraction of cohesion, of gravitation and of magnetism are all one and the same. The author was subsequently Principal Librarian of the British Museum.

—See also 394.

351. **Rackstrow, B.** (— — —) Miscellaneous observations, together with a collection of experiments on electricity. With the manner of performing them, designed to explain the nature and cause of the most remarkable Phaenomena thereof. With some remarks on a pamphlet, entitled: A sequel to

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the experiments and observations tending to illustrate the nature and properties of electricity (by Sir William Watson), to which is annexed a letter written by the author to the Academy of Sciences at Bordeaux, relative to the similarity of electricity to lightning and thunder. iv+72 pp. 8vo. London, for the author.

*London, 1748*

The author holds that electricity and the ether of space are one; curious list of non-electrics, p. 24; list of experiments made by the author, p. 28; lightning due to electricity, pp. 65, 72. (See No. 333b.)

352. **Watson, (Sir) William.** (1715-1787.) An account of the experiments made by some gentlemen of the Royal Society in order to discover whether the electrical power would be sensible at great distances, with an inquiry concerning velocities of electricity and sound; to which are added, Some further inquiries into the nature and properties of electricity. 1 l.+90 pp. ill. 8vo. London, for C. Davis.

*London, 1748*

Le Monnier's experiment in a pond near the Tuilleries, p. 3; Watson's experiment on the Thames, p. 5; the coatings of the Leyden jar used on this noteworthy occasion were iron filings and sheet lead, p. 5; one-mile circuit, p. 40; velocity of sound and electricity, pp. 42, 47; flashes inside jar at time of discharge, p. 74. We owe the term *circuit* to Watson, who established the law that the resistance to electric flow depends on the length and material of the conductors.

—See also 333.

353. **Borbone, Filippo.** (— — — .) I fenomeni elettrici con i corollari da lor dedotti e con i fonti di cio che rende malegavole la ricerca del principio elettrico. xii+44 pp. 4to. Parma, G. Rosati.

*Parma, 1749*

Experiments showing the behavior of "electric matter."

354. **N(eedham), (John) T(urberville.)** (1713-1781.) Extract of a letter from Paris, concerning some new electrical experiments made lately there. (Signed: T. N., i.e., J. T. Needham). Copied from Phil. Trans., R. S. Vol. 44, pp. 247-273, (1748). 7 pp. 4to.

*London, (1749)*

The experiment of the Leyden jar is described on p. 3 where its discovery is attributed to van Musschenbroek; the residual charge is noticed on p. 4.

355†. **Nollet, (Jean Antoine).** (1700-1770.) Recherches sur les causes particulières des phénomènes électriques. xxxvi+444 pp. 8 plates. 12mo. Paris, Guerin.

*Paris, 1749*

The author lays down a theory, according to which the cause of electrical phenomena is the "effluence and affluence" of a subtle fluid which is everywhere present. Some interesting experiments are described with vacuum tubes also on the influence of electric charges on the growth of plants.

355a.— —Nouvelle édition. xxxvi+444 pp. 8 plates. 12mo. Paris, Guerin.

*Paris, 1754*

—See also 319.

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352. WATSON.

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356. **Boullanger.** (—.—.) Traité de la cause et des phénomènes de l'électricité. 2 vols. 2 plates. 8vo. Paris, Pecquet.

Paris, 1750

In part i. it is said that bodies which are most susceptible of electrification are transparent and brittle, p. 63; construction of the first cylindrical electrical machine attributed to *Andrew Gordon*, a Scotch Benedictine, living at Erfurt, p. 23; dark-colored ribbons most strongly attracted, p. 124; Part ii. propagation of electricity, p. 4; principle of the *siphon recorder*, p. 59; experiments with flames, p. 67.

357\*. **Dutour, Etienne François.** (1711-1784.) Explication de deux phénomènes de l'aimant, sur les différences qu'apportent les secousses données à un carton sur lequel ou étend de la limaille de fer à l'arrangement de cette limaille présentée à la pierre d'aimant. (Mém. Math. et Phys. Vol. i. pp. 375-382.) 4to.

Paris, 1750

On the effect of tapping paper when covered with iron filings and resting on a magnet.

358. **Michell, J(ohn) (also Michel).** (1724-1793.) Treatise of artificial magnets; in which is shewn an easy and expeditious method of making them, and also a way of improving the natural ones and of changing or converting their poles; directions are likewise given for making the mariner's needles. 11.+81 pp. 1 plate. 8vo. Cambridge, Bentham.

Cambridge, 1750

Recognition of the law of the *inverse square* for magnetic attraction and repulsion, p. 19; method of "double touch;" consequent poles, p. 57; ring magnet, p. 80.

358a.—Second edition corrected. 78 pp. 1 plate. 8vo. Cambridge, Bentham.

Cambridge, 1751

358b.—(French translation.) Traité sur les aimans artificiels; Contenant une méthode courte et aisée pour les composer et leur donner une vertu supérieure à celle des aimans ordinaires, une manière d'augmenter la force des aimans naturels et de changer leurs poles; Un moyen de faire des aiguilles de boussoles meilleures que celles qui sont en usage, et de leur communiquer une vertue plus forte et plus durable. Traduits de deux ouvrages Anglois de J. Michell et J. Canton, par le P. Rivoire de la C. de J. Avec une préface historique du traducteur, où l'on expose les Méthodes et les Expériences de MM. Duhamel and Antheaume de l'Académie des Sciences pour perfectionner ces aimans. Avec figures. vii+cxx+160 pp. 4 plates. 12mo. Paris, par Hippolyte Louis Guerin.

Paris, 1752

359. **Moro, Antonio Lazzaro.** (1687-1764.) Lettera o sia dissertazione sopra la calata de' fulmini dalle nuvole. 131 pp. 12mo. Venezia.

Venice, 1750

Minerals liable to be struck by lightning, p. 6; lightning due to the ignition of inflammable exhalations, p. 25; the interval of time between seeing the lightning and hearing the thunder depends on the distance of the discharge, p. 29.

*Fifthly*, The Poles of Magnets are not at their Extremities, but at a little distance from thence; that is, Magnets are not so Magnetic at the Ends, as in the Middle; and in spring-temper'd and soft Steel Magnets, the Poles are generally somewhat farther from the Extremities than in hard ones.

\* *Sixthly*, The Attraction and Repulsion of Magnets decrease, as the Squares of the distances from the respective Poles increase.

This property, from some experiments I have made myself, and from those I have seen

C 2 of

equality, the greater the distance of the two Magnets is, with which the experiments are made; and *vice versa*: And so great is the effect of Magnets on each other, that, when the repellent Poles of a large Magnet and a small one are brought into contact, the small one shall sometimes have its Repellency changed into Attraction.

\* There have been some, who have imagined, that the decrease of the Magnetic Attraction and Repulsion is inversely as the Cubes of the distances; others, as the Squares; and others, that it follows no certain ratio at all, but that it is much quicker at greater distances, than at small ones, and that it is different in different Stones: amongst these last is Dr. *Brook Taylor*, and *P. Muschenbroek*, who seem to have been pretty accurate in their experiments. [See *Philosop. Transf.* No 368 and 390. or Vol. VI. Part II. Page 253 and 255. *Eames's Abridgement*.] The conclusions of these Gentlemen were drawn from their

CATALOGUE OF WHEELER GIFT

360. **Pietsch, J(ohann) G(ottfried.)** (— — .) Abhandlung von der Erzeugung des Salpeters. (Gedanken von der Vermehrung des Salpeters.) 46 pp. 4to. Berlin, A. Haude. *Berlin, 1750* Prize-essay on the production of potassium nitrate.

361. **Stukeley, William.** (1687-1765.) The philosophy of earthquakes, natural and religious, Or an inquiry into their cause and their purpose. Second edition. 2 parts. (In the first edition only one part was published.) 61+32 pp. 8vo. London. *London, 1750*  
Polar aurorae, fire-balls and lightning are all considered to be electrical effects.

362†. **Wilson, B(enjamin.)** (1708-1788.) A treatise on electricity. By B. W. xiii+223 pp. 5 plates. 8vo. London, Davis. *London, 1750*  
Discharging property of points, edges and flame, p. 7; Smeaton's condensing air-pump, p. 24; the term *electric circuit* in reference to a condenser, p. 67; lead used for coatings of Leyden jar, p. 71; shock given to any particular part of the body, p. 88; identity of the universal ether with electricity, p. 95; the ether, p. 100; all bodies may be electrified, p. 111; effect of discharge on the body, p. 208; magnetic polarity *inverted* by the jar discharge, p. 219.

362a.—Second edition. 10+224 pp. 4 plates. 8vo. London, C. Davis. *London, 1752*  
—See also 334.

363. **Barhow, L.** (— — .) Richtig angestellte und aufrichtige mitgetheilte Observationes von dem seit eines halben Seculi sich in den meisten europaeischen Laendern sehr merklich zeigenden und bekannt gewordenen Phaenomeno, unter dem Namen von Nord-Licht. 5 l.+104 pp. 1 plate. 12mo. Frankfurt, F. C. Mumme. *Frankfort, 1751*  
Observations on the aurora borealis.

364. **Desaguliers, Jean Théophile.** (1683-1744.) Cours de physique expérimental, traduit de l'anglois par le R. P. Pezenas. 2 vols. 68 plates. 4to. Paris, Jacques Rollin. *Paris, 1751*  
—See also 249.

365\*. **Digard, (de Kerguette, J.)** (1717- ? .) Discours sur la facilité et l'utilité des mathématiques. 32 pp. 4to. Paris. *Paris, 1751*  
General considerations on algebra and geometry and the ease with which these subjects may be studied.

366. **Euler, Leonhard.** (1707-1783). Opusculorum Tomus iii. continens novam theoriam magnetis ab illustr. Academia regia scientiarum Parisiana praemio condecoratam 1744 una cum nonnullis aliis dissertationibus. 1 l.+165 pp. 4 plates. 4to. Berolini, sumptibus Ambr. Haude. *Berlin, 1751*  
Euler adopts the Cartesian doctrine of pores and magnetic particles, magnetic matter is more subtile than the ether itself and is propagated through a magnet in one direction only, p. 10; declination and dip explained, p. 30. The author was the celebrated Swiss mathematician.  
—See also 635, 958.

EXPERIMENTS

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367. FRANKLIN. (Reduced.)

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367. Franklin, Benjamin. (1706-1790.) Experiments and Observations on Electricity, made at Philadelphia in America, By Mr. Benjamin Franklin, and Communicated in several Letters to P. Collinson of London, F. R. S. 2 l.+86 pp.+1 l. 1 plate. 4to. London, Printed and sold by E. Cave.

London, 1751

Celebrated work of the American philosopher. The terms positive and negative, pp. 3, 15; action of pointed conductors, pp. 10, 57; lead used for the *inner coat* of Leyden jar, p. 16; discharge by *alternate contact*, p. 21; an insulated jar cannot be charged, p. 25; analogy of charged jar and *bent spring*, p. 23; seat of charge, p. 24; Franklin's pane, p. 25; electric dinner, p. 34; aurorae, p. 46; common matter self-attractive, electrical matter self-repellent, p. 51. Copies of this edition are rare.

"These experiments and discoveries, which have given Franklin such fame, were the work of four men: Benjamin Franklin, Philip Syng, Thomas Hopkinson and Ebenezer Kinnersley; but, owing to Franklin's writing of them to England, they were published in his name, and have redounded to his credit solely." (Ford, P. L., Franklin Bibliography.)

367a.——New Experiments and Observations on Electricity. Made at Philadelphia in America, by Benjamin Franklin, Esq., and Communicated in Several Letters To Peter Collinson, Esq., of London, F. R. S. Part i. the second edition. 2 l.+86 pp. Part ii. 2 l.+pp. 89-107+1 l. Part iii. By Benjamin Franklin, Esq., Communicated to P. Collinson, Esq., of London, F. R. S. And read at the Royal Society June 27, and July 4, 1754. To which are added A Paper on the same subject by J. Canton, M. A., F. R. S. and read at the Royal Society Dec. 6, 1753; and another in defense of Mr. Franklin against the Abbé Nollet, by Mr. D. Cobden, of New York. Part iii. 4 l.+pp. 111-154. 4to. London, Printed and sold by D. Henry and R. Cave. London, 1754

Remarks on Abbé Nollet's letter on electricity, by Mr. David Cobden (pp. 130-142.) Electrical experiments, with an attempt to account for their several phenomena; together with some observations on thunder-clouds, in further confirmation of Mr. Franklin's observations on the positive and negative electrical states of clouds, by John Canton (pp. 143-152.) (See No. 379.)

367b.——Experiments and Observations On Electricity made at Philadelphia in America, by Benjamin Franklin, LL.D. and F.R.S. To which are added, Letters and Papers on Philosophical Subjects. The Whole corrected, methodized, improved, and now first collected into one volume, and illustrated with Copper Plates. 4 l.+496 pp. 5 plates 4to. London, Printed for David Henry; and sold by Francis Newbery.

London, 1769

367c.——The Fifth Edition. 2 l.+vi+514 pp.+8 l. 7 plates. 4to. London, Printed for F. Newbery. London, 1774

367d.——(French translation.) Expériences et Observations sur l'Electricité faites à Philadelphie en Amérique; et commu-

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371. FREKE.

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niquées dans plusieurs lettres à Mr. P. Collinson de la Société Royale de Londres. Traduites de l'Anglois (par M. d'Alibard et le Comte de Buffon). 24+lxx pp.+51.+222 pp.+161. plate. 8vo. A Paris, chez Durand. *Paris, 1752*

These Philadelphia letters were translated by M. d'Alibard at the request of Count de Buffon; they attracted considerable attention and led d'Alibard and others to experiment with pointed conductors; d'Alibard's experiment at Marly, vol. ii., p. 119.

367e.—Seconde édition. Revue, corrigée & augmentée d'un supplément considérable du même Auteur, avec des Notes & Expériences nouvelles. Par M. d'Alibard. 2 vols. 21.+349 pp.+11. plate. 8vo. Paris, chez Durand. *Paris, 1756*

This edition contains the *Supplementary Experiments*.

367f.—(German translation.) Des Herrn Benjamin Franklin, Esq. Briefe von der Elektricitet. Aus dem Englandischen uebersetzt, nebst Anmerkungen von J. C. Wilcke. 13 l.+354 pp. plate. 8vo. Leipzig, verlegts Gottfried Kiesewetter, Buchh. in Stockholm. *Leipzig, 1758*

—See also 449, 481, 529, 675, 696.

368. **Gordon, Andreas.** (1712-1751.) Physicae experimentalis elementa (in usum Academiae Erfordiae). 2 vols. 49 plates. 12mo. Erfordiae, litteris Nonnianis. *Erfurt, 1751-1753*

The lodestone, pp. 231-246; glass cylinder substituted for glass globe, p. 248; electricity useful in case of paralysis, p. 278; it causes evaporation, p. 279; electrified birds lose weight, p. 282.

—See also 317.

369†. **Grollier de Servières, Nicolas.** (1593-1686.) Recueil d'ouvrages curieux de mathématique et de mécanique; ou, Description du cabinet de Monsieur Grollier de Servières. Seconde édition. 13 l.+152 pp. 88 plates. 4to. Paris. *Paris, 1751*

Collection of full-page designs including clocks, lamps, pontoon-bridges, rafts, and machinery of various kinds. The first edition appeared in 1719, The author was a mechanical genius.

370. **Ludolff, C(hristian) F(riederich), (the younger).** (1707-1763.) Mémoire sur l'électricité des baromètres. Traduit du Latin. (Mém. de l'Acad. Roy. des Sc. de Berlin, 1749, pp. 1-7.) 7 plates, 4to. *Berlin, 1751*

Production of electricity in a barometer by friction of the mercury against the sides of the tube.

371. **Freke, John.** (1662-1744.) Treatise on the nature and property of fire, in three essays. i. Shewing the cause of vitality, and muscular motion with many other phenomena. ii. On electricity. iii. Shewing the mechanical cause of magnetism; and why the compass varies in the manner it does. viii.+196 pp.+13 l. 8vo. London, for W. Innys and J. Richardson.

*London, 1752*

Identity of electricity and lightning, p. 105; fire is the cause of electricity and magnetism, pp. 65, 145; the ether of space, p. 125; electricity not as good a term as vivacity; electrified bodies have magnetic properties, p. 165.

—See also 325.

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375. BECCARIA. (Reduced.)

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372. **Mangin**, (l'Abbé). ( ? -1772.) *Histoire générale et particulière de l'électricité; ou, ce qu'en ont dit de curieux et d'amusant quelques physiciens de l'Europe.* 3 vols. 1 plate. 12mo. Paris, Rollin. *Paris, 1752*  
 Statement of the work and discoveries of physicists from Gilbert to Franklin; part ii. exposes and discusses the various theories proposed; part iii. describes the effects of electricity on the body and its value in curative medicine. Quérard states that this work has been erroneously attributed to Guer, a lawyer.

373. **Penrose**, Francis. (1718-1798.) *Treatise on electricity, wherein its various phænomena are accounted for and the cause of the attraction and gravitation of solids assigned; to which is added, a short account how the electrical effluvia act upon the animal frame.* 40 pp. 8vo. Oxford. *Oxford, 1752*  
 Machine electricity is attributed to the friction of air between the glass-globe and the hand of the operator, p. 16; the earth is devoid of attraction, p. 25; electric effluvia and light, p. 36.  
 —See also 380.

374. (Bazin, Gilles Augustin). ( ? -1754.) *Description des courants magnétiques dessinés et gravés d'après nature en xv planches, suivie de quelques observations sur l'aiman par M. de l'Académie des Belles-Lettres de la Rochelle et Correspondent de l'Académie Royale des Sciences de Strasbourg.* 21.+54 pp.+ 1 l. 15 plates. 4to. Strasbourg, Jean-François de Le Roux. *Strasburg, 1753*  
 The magnetic field illustrated with numerous diagrams and plates. A supplement appeared in 1754.

375†. **Beccaria**, Giacomo Battista. (1716-1781.) *Dell' elettricismo artificiale, e naturale libri due.* 4 l.+245 pp. 4to. Torino, Filippo Antonio Campana. *Turin, 1753*  
 This (first) edition of an important work contains the author's early contributions to the subject of atmospheric electricity; Beccaria adopted the Franklinian theory. The author was an Italian priest and professor of experimental physics at Turin. For English translation, see No. 457. (See No. 1465.)  
 —See also 392bis, 424, 435bis, 450, 457.

376. **Belgrado**, Jacopo. (1704-1789.) *Della riflessione dei corpi dall' acqua e della diminuzione della mole de Sassi ne' Torrenti, e ne Fiumi dissertazioni due.* xi+99 pp. 1 plate. 4to. Parma, nella R. D. stamperia Monti. *Parma, 1753*  
 Discussion of the phenomena of reflection and refraction at plane surfaces.  
 —See also 305.

377. **Eeles**, Henry. (1700-1781?) *Philosophical essays.* Folio. *Lismore, 1753-1761*  
 The cause of thunder; electrical theory; reflection and refraction of light; medical effects of electricity. Manuscript letters of Major Eeles of Lismore with commentary on each by Robert J. Lecky. (See Nos. 433, 2456.)

377a.— —Philosophical essays in several letters to the Royal Society, with a preface. xlxi+189 pp. 8vo. London, for G. Robinson and J. Roberts. *London, 1771*  
 Original considerations on the dual nature of electricity in which the author

and am now here to join my intreaties with his, that you may be happy for ever."

To relate all that was said upon this occasion, would be to extend my story to another paper. Wilson was all submission and acknowledgment; the wife cried and doubted, and the widow vowed an eternal separation. To be as short as possible, the harmony of the married couple was fixed from that day. The widow was handsomely provided for, and her child, at the request of Mrs Wilson, taken home to her own house; where at the end of a year she was so happy, after all her distresses, as to present him with a sister, with whom he is to divide his father's fortune. His mother retired into the country; and, two years after, was married to a gentleman of great worth; to whom, on his first proposals to her, she related every circumstance of her story. The boy pays her a visit every year, and is now with his sister upon one of these visits. Mr Wilson is perfectly happy in his wife; and has sent me, in his own hand, this moral to his story:

"That though prudence and generosity may not always be sufficient to hold the heart of a husband, yet a constant perseverance in them will, one time or other, most certainly regain it."

*To the author of the SCOTS MAGAZINE.*

*SIR, Renfrew, Feb. 1. 1753.*

IT is well known to all who are conversant in electrical experiments, that the electric power may be propagated along a small wire, from one place to another, without being sensibly abated by the length of its progress. Let then a set of wires, equal in number to the letters of the alphabet, be extended horizontally between two given places, parallel to one another, and each of them about an inch distant from that next to it. At every twenty yards end, let them be fixed in glass, or jeweller's cement, to some firm body, both to prevent them from touching the earth or any other non-electric, and from breaking by their own gravity. Let the electric gun-barrel be placed at right angles with the

extremities of the wires, and about an inch below them. Also let the wires be fixed in a solid piece of glass, at six inches from the end; and let that part of them which reaches from the glass to the machine, have sufficient spring and stiffness to recover its situation after having been brought in contact with the barrel. Close by the supporting glass, let a ball be suspended from every wire: and about a sixth or an eighth of an inch below the balls, place the letters of the alphabet, marked on bits of paper, or any other substance that may be light enough to rise to the electrified ball; and at the same time let it be so contrived, that each of them may resume its proper place when dropt. All things constructed as above, and the minute previously fixed, I begin the conversation with my distant friend in this manner. Having set the electrical machine a-going as in ordinary experiments, suppose I am to pronounce the word *Sir*; with a piece of glass, or any other *electric per se*, I strike the wire *S*, so as to bring it in contact with the barrel, then *i*, then *r*, all in the same way: and my correspondent, almost in the same instant, observes these several characters rise in order to the electrified balls at his end of the wires. Thus I spell away as long as I think fit; and my correspondent, for the sake of memory, writes the characters as they rise, and may join and read them afterwards as often as he inclines. Upon a signal given, or from choice, I stop the machine; and taking up the pen in my turn, I write down whatever my friend at the other end strikes out.

If any body should think this way tiresome, let him, instead of the balls, suspend a range of bells from the roof, equal in number to the letters of the alphabet; gradually decreasing in size from the bell *A* to *Z*: and from the horizontal wires, let there be another set reaching to the several bells; one, *viz.* from the horizontal wire *A* to the bell *A*, another from the horizontal wire *B* to the bell *B*, &c. Then let him who begins the discourse bring the wires in contact with the barrel, as before; and the electrical spark, breaking on bells of different

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controverts the views by Franklin. An account of the author's life is given in a letter written by Robert J. Lecky to Latimer Clark, and dated April 12, 1878.

378. **M(arshall), C(harles) or (Charles Morrison.)** (— — —.) A printed letter. *Scots Magazine*, Vol. xv., pp. 73-74. 8vo.  
*Edinburgh, 1753*

The letter signed C. M., p. 73, contains the earliest known reference to an *electric telegraph*; the letters *C. M.* stand for Charles Marshall of Paisley according to Latimer Clark and for Charles Morrison of Greenock according to Sir David Brewster, (No. 1315) and Latimer Clark, (5389). Very rare.  
—See also 1315, 1498, 1698, 1771, 1929, 2208, 3224, 5389.

379. **Nollet, (Jean Antoine).** (1700-1770.) *Lettres sur l'électricité*, dans lesquelles on examine les dernières découvertes qui ont été faites sur cette matière, et les conséquences que l'on en peut tirer. xii+264 pp. 12mo. Paris, Guérin et Delatour.

*Paris, 1753*

Six letters written to Franklin often controverting his views; letter to Jallabert of Geneva and Bose of Wittenberg; theory of effluent and affluent matter; papers by Symmer and Birch with remarks by the author. (See No. 367a.)

379a.—(Another edition.) *Dans lesquelles on soutient le principe des effluences & affluences simultanées contre la doctrine de M. Franklin, & contre les nouvelles prétentions de ses partisans. Seconde Partie (complete in 2 vols.)* 12mo. Paris, Guérin et Delatour.  
*Paris, 1760*

379b.—(Another edition.) *Lettres sur l'électricité*, dans lesquelles on trouvera les principaux phénomènes qui ont été découverts depuis 1760; avec des discussions sur les conséquences qu'on en peut tirer. *Troisième partie. Second edition (Complete in 3 vols.)* 12mo. Paris, Durand.  
*Paris, 1770*

—See also 319.

380. **Penrose, Francis.** (1718-1798.) *Essay on Magnetism; or, An endeavour to explain the various properties of the loadstone; together with the causes of the same.* 40 pp. 12mo. Oxford.  
*Oxford, 1753*

Magnetism is due to "the powerful action of incumbent fluids" or ether streams, p. 25; there is no absolute vacuum in nature, p. 17.  
—See also 373.

381. **Rabiqueau, Ch(arles.)** (— — —.) *Le spectacle du feu élémentaire; ou, Cours d'électricité expérimentale*, où l'on trouve l'explication, la cause et le mécanisme du feu dans son origine, etc. (Lettre sur la mort de M. Richmann. Relation curieuse et intéressante pour le progrès de la physique et de la médecine.) 21.+296 pp.+21. 10 plates. 8vo. Paris, Jombert.  
*Paris, 1753*

Experiments on the nature and effects of the electric discharge in illustration of the author's views; death of Prof. Richmann of St. Petersburg while experimenting with atmospheric electricity in 1753.

ESSAY SUR L' ELECTRICITE DES CORPS · FRONTISPICE



379. NOLLET. *Frontispiece.*

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382. **Mairan**, (Jean Jacques d'Ortous de). (1678-1711.) *Traité physique et historique de l'aurore boréale.* (Suite des Mémoires de l'Académie pour 1731). Seconde édition, revue et augmentée. 570+xxii pp. pl. 4to. Paris, Imprimérie Royale. *Paris, 1754*  
 Inquiry into the history and physics of the aurora borealis; the chapter on the relation between the aurora and the magnetic declination is of special interest. The first edition appeared in 1733. (See No. 2452.)

383. **Musschenbroek**, Pieter van. (1692-1761.) *Dissertatio physica experimentalis de magnete.* Lugduni Batavorum anno 1729 edita nunc vero auditoribus oblata. 2 1.+283 pp. 10 plates. 4to. Viennae, typis Joannis Thomae Trattner. *Vienna, 1754*  
 Edition of 1729 enlarged.  
 —See also 257.

384. **New and complete dictionary of arts and sciences**, comprehending all the branches of useful knowledge with accurate descriptions. Extracted from the best authors in all languages by a Society of Gentlemen. Vols. 2 & 3. (Complete in 4 vols.) pl. 8vo. London for W. Owen. *London, 1754*  
 In article on electricity, Franklin's kite experiment is described in detail, vol. ii., p. 1040; in vol. iii., Canton's method of making magnets, p. 1971.

385. **Béraud**, Laurent. (1703-1777.) *Theoria electricitatis.* (Appendix to Johann Albrecht Euler's *Disquisitio de causa physica electricitatis.*) pp. 95-144. 4to. (Petropoli). *(St. Petersburg, 1755)*  
 Electric matter is a subtle fluid distinct from elementary fire yet sometimes assuming its form and properties. The phenomena of attraction and repulsion, lightning, thunder, etc., are considered in Part iii. Béraud was a French Jesuit and astronomer. (See No. 386.)

386. **Euler**, Johann Albrecht. (1734-1800.) *Disquisitio de causa physica electricitatis, una cum aliis duabus dissertationibus de eodem argumento.* 28 pp. 4to. Petropoli. *St. Petersburg, 1755*  
 Prize essay on the physical cause of electricity in which the electrical fluid is identified with the ether. The author was son of Euler, the celebrated mathematician. (See No. 385.)

387. **Frissi**, Paolo. (1728-1784.) *De existentia et motu aetheris seu de theoria electricitatis ignis et lucis, dissertatio.* pp. 29-94. 4to. (Petropoli). *(St. Petersburg, 1755)*  
 Electricity a phenomenon of the ether. Electric light in rarefied media, p. 67; Beccaria's experiments on atmospheric electricity, p. 81.

388. **Premoli** (Carlo). (— — —.) *Nova electricitatis theoria.* 91 pp. 1 plate. 12mo. Mediolani, Fr. Agnellum. *Milan, 1755*  
 Speculations on the nature of electric force.

389. **Salchow**, Ulrich Christoph. (1722-1787.) *Explicatio separationis auri ab argento per aquam fortem factae et modi vilioris haec duo metalla a se invicem segregandi.* 19 pp. 4to. Petropoli. *St. Petersburg, (1755)*  
 Chemical process for the separation of gold from silver.

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390. **Cartier, Gallus.** (— — —.) *Philosophia eclecticæ ad mentem et methodum celeberrimorum nostræ aetatis philosophorum concinnata, et in quatuor partes, logicam nempe, metaphysicam, physicam et ethicam distributa. Accedunt Exercitationes philosophicæ et Elementa Geometriae.* 4 l.+46 +74+495+41 (Index)+132+2 (Errata) pp. 15 plates. 4to. Augustæ Vindelicorum et Wirceburgi, J. Adam et Fr. A. Veith. *Augsburg & Wurzburg, 1756*  
References to lightning and St. Elmo's fires, p. 312; amber, p. 328; the magnet, declination and dip, p. 330; the invention of the compass, p. 330.

391\*. **Lovett, R(ichard).** (1692-1780.) *The subtil medium prov'd; or, That wonderful power of nature, so long conjecture'd by the most ancient and remarkable philosophers which they call'd sometimes aether; but oftener elementary fire, verifi'd. Giving an account of the progress and several gradations of electricity, from those ancient times to the present; its various uses in the animal oeconomy, the method of applying it, etc.* 3 l.+141 pp.+2 l. 8vo. London, for J. Hinton. *London, 1756*  
*Dialogue on the nature and properties of electrics and non-electrics, followed by cases showing the healing power of electricity.*

391a.——Sir Isaac Newton's aether realized; or, The second part of The subtil medium prov'd, and electricity rendered useful, being a vindication of that essay, in answer to the animadversions made thereon by the Monthly Review. 77 pp. 8vo. London, for the author. *London, (1759)*  
Electricity and the Newtonian ether are held to be identical.

391b.——The reviewers review'd; or, The bushfighters exploded; being a reply to the animadversions, made by the author of the Monthly Review, on a late pamphlet, entitled Sir Isaac Newton's aether realiz'd. To which is added, by way of appendix, Electricity, render'd useful in medicinal intentions. 3 l.+41 pp. 8vo. Worcester, for the author. *Worcester, 1760*  
Original views concerning the existence of an electric medium; its identity with the Newtonian ether defended.

391\*c.——A letter to the authors of the Monthly Review; or, a reply to their animadversions on a pamphlet lately published, intituled, The reviewers review'd. 2+27 pp. 8vo. London, for the author. *London, 1761*  
Polemical pamphlet on the author's electro-etheric views.  
—See also 417, 447.

392. **Nebel, D(aniel) W(ilhelm).** (1735-1805.) *De magnete artificiali.* 68 pp. 4to. (Inaugural dissertation.) Trajecti ad Rhenum, Joh. Broedelet. *Utrecht, 1756*  
Discussion of the magnetic work of Mitchell, Knight and others, with illustrations of experiments.

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392† bis. **Beccaria, Giambattista.** (1762-1781.) *Dell' elettricismo.* Lettere . . . dirette al sig. Giacomo Bartolomeo Beccaria, professore di chimici nell' Istituto di Bologna. Coll' appendice di un nuovo fosforo descritto all'illustre sig. conte Ponte di Scarnafigi. 378 pp. 4to. *Bologna, 1758*  
The several main headings of the book are *Dell' elettricismo artificiale, e naturale; Dell' elettricismo terrestre atmosferico; Di' un nuovo fosforo, e della spiegazione di esso.* (See Nos. 435bis, 450, 457.)  
—See also 375.

393†. **de M. G. C. (i.e., J(ohn) B(aptiste) Girardin.)** ( ? -1783.) *Reflexions physiques, en forme de commentaire, sur le chapitre huitième du livre des Proverbes, depuis le verset vingt-deux jusqu'au verset trente-un par M. G. C. de M. (i.e., J. B. Girardin, curé de Mailleroncourt.)* 434 pp.+61. 12mo. Paris, Vautrin. *Paris, 1758*  
Remarks on cosmic physics with reference to certain controverted passages of Scripture.

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The author's method (separate touch) of making strong magnets, p. 14; polarity of ship's compasses destroyed by lightning, p. 17.  
—See also 350.

395. **Aepinus, F(ranz Maria) U(lrich) T(hedor).** (1724-1802.) *Tentamen theoriae electricitatis et magnetismi; accedunt dissertationes duae, quarum prior, phaenomenon quoddam electricum, altera magneticum, explicat, instar supplementi Commentariorum Academiae Imperialis Petropolitanae.* 390 pp. 7 plates. 4to. Petropoli Typis Acad. Scient. *St. Petersburg, (1759)*  
The author, a pioneer investigator, adopts and modifies Franklin's one-fluid theory; submits electrical phenomena to mathematical analysis. Electrification of tourmaline, p. 77; affinity of electricity and magnetism, p. 187; the author's well-known form of condenser, pp. 88, 355; magnetism of the earth, p. 257.  
—See also 400.

396. **Egeling, J. ( — - — .)** *Disquisitio physica de electricitate.* 55 pp. 4to. Trajecti ad Rhenum, J. Broedelet. *Utrecht, 1759*  
Paper of some historic interest on electricity and the phenomena of electric discharge.

397. **Hoadley, (Benjamin).** (1706-1757.) and (Benjamin) **Wilson.** (1708-1788.) *Observations on a series of electrical experiments, with alterations and the addition of some experiments, letters, and explanatory notes by B(enjamin) Wilson.* Second edition. 2 v. +86 pp. 4to. London, for T. Payne. *London, 1759*  
The electric fluid and the universal ether are the same. The first edition appeared in 1756.  
—See also 334.

TENTAMEN THEORIAE  
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ET  
MAGNETISMI.

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Accedunt Dissertationes duae, quarum prior,  
phaenomenon quoddam electricum, altera  
magneticum, explicat.

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395. AEPINUS. (Reduced.)

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398. **Martin**, Benjamin. (1704-1782.) Young gentleman and lady's philosophy, in a continued survey of the works of nature and art, by way of dialogue. 2 vols. 52 plates. 8vo. London.  
*London, 1759-1763*  
 Lightning and the aurora borealis, p. 289; death of Professor Richmann of St. Petersburg, p. 324.  
 —See also 327.

399. **Scarella**, Giambattista. (1711-1779.) De magnete libri quatuor. 2 vols. 1 plate and 1 map. 4to. Brixiae, excudebat Joannes-Maria Rizzardi.  
*Brescia, 1759*  
 Magnetic theory and method of making magnets. Objections to magnetic effluvia, Book ii., p. 122; how magnets are made, p. 279; Book iii., tables of declination and dip, p. 217.

400. **Aepinus**, F(ranz Maria) U(lrich) T(hedor). (1724-1802.) Akademische Rede von der Aehnlichkeit der elektrischen und magnetischen Kraft. 44 pp. 12mo. Leipzig, J. Fr. Gladitsch.  
*Leipzig, 1760*  
 Address on the similarity of electric and magnetic forces.  
 —See also 395.

401\*. **Oberst**, Joseph. (—.) Conjecturae arbitriae circa triplicem magnetis naturam una cum Placitis Scoto-Sophicis. 48 pp. 12mo. Augustae Vindelicorum.  
*Augsburg, 1760*  
 On the three-fold power of the magnet; attractive, directive and inductive.

402. **Symmer**, Rob(ert). ( ? -1763.) New experiments and observations concerning electricity. With a letter from J. Mitchell, 59 pp. 4to. London, Davis & Reymers.  
*London, 1760*  
 Pamphlet of considerable interest. The author's two-fluid theory stated, p. 36. "I think we may fairly conclude that what is called *negative* electricity is, in reality, a *positive* active power," p. 38.

403. **Wesley**, John. (1703-1791.) The desideratum; or, Electricity made plain and useful by a lover of mankind, and of common sense. 72 pp. 12mo. London.  
*London, 1760*  
 Quaint *résumé* of electrical knowledge. The discharge of a Leyden jar will "give polarity to a fine needle, will invert the polarity of a compass," p. 21; list of cures effected by electrical treatment from which the author concludes that electricity "is the noblest medicine yet known in the world," p. 72. The author was the founder of Methodism.

403a.——Fourth edition. 72 pp. 12mo. London, R. Hawes.  
*London, 1778*

403b.——Another edition. vii+72 pp. 12mo. London, Ballière, Tindal & Co.  
*London, 1871*  
 —See also 700.

404. **Croker**, Tempie Henry. (1730?-1790?) Experimental magnetism; or, The truth of Mr. Mason's discoveries in that branch of natural philosophy proved and ascertained. x+72 pp. 2 plates. 12mo. London, for J. Coote.  
*London, 1761*  
 The invention of the compass, p. 2; declination and dip first observed, p. 4; central terrestrial magnet denied, p. 48; magnetic perpetual-motion machine, p. 61.

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403a. *WESLEY.*

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405. **Dollond, P(eter).** (1730-1820) and **J(ohn) Dollond.** (1706-1761.) Directions for using the electrical machine made by P. and J. Dollond. 24 pp. 1 plate. 8vo. London. *London, 1761* Canton suggests an *amalgam* of tin and mercury for use with frictional machines, p. 4; flap of *oiled silk*, p. 4; Henley's "electrometer," p. 24. The Dollonds were famous London opticians.

406. **Jones, William.** (1726-1800.) *Essay on the first principles of natural philosophy, wherein the use of natural means, or second causes, in the economy of the material world is demonstrated from reason, in four books.* 3 l.+281 pp. 7 plates. 4to. Oxford, S. Parker. *Oxford, 1762* Strong shock from Leyden jar, p. 136; paralysis cured by electric shock, p. 260.  
—See also 500, 622.

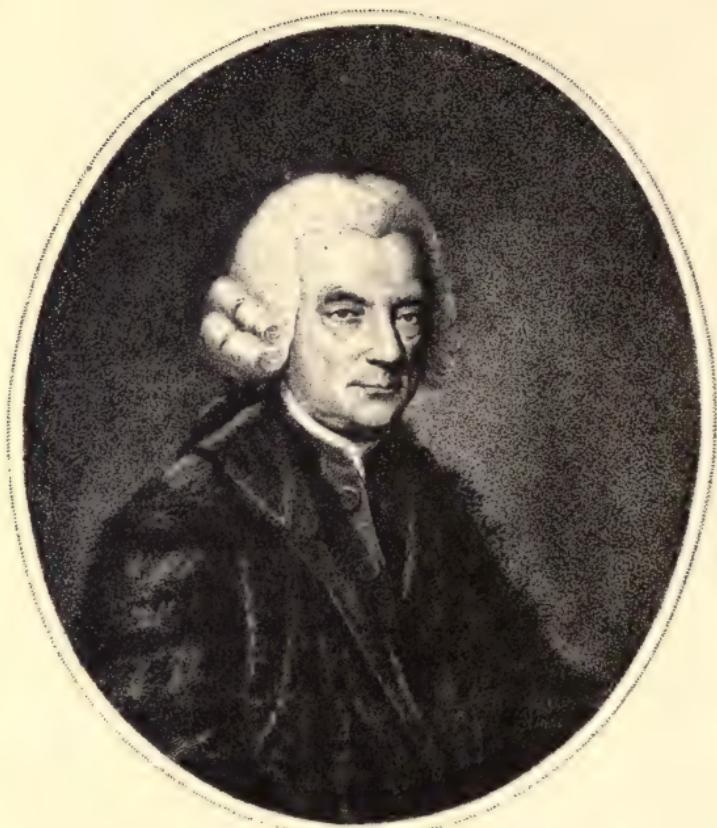
407. **Albertus Parvus, Lucius (pseud.)** (— — .) *Les secrets merveilleux de la magie naturelle et cabalistique du Petit Albert, traduits exactement sur l'original Latin, qui a pour titre: "Alberti Parvi Lucii Libellus de mirabilibus naturae arcanis," enrichis de plusieurs figures mystérieuses pour former des talismans, avec la manière de les faire.* 245 pp. 10 plates. 16mo. Lyon, chez les Héritiers de Beringos Fratres. *Lyons, 1762* Work on natural magic; sympathetic compasses, p. 228.

408. **Bertrand, E(lie).** (1712-1790.) *Dictionnaire universel des fossiles propres et des fossiles accidentels.* xxxii+606 pp. 12mo. Avignon, Louis Chambeau. *Avignon, 1763* List of writers on the magnet, p. 14. Bertrand was a Swiss naturalist.

409. **(Harrison, John).** (1693-1776.) *An account of the proceedings, in order to the discovery of the longitude: in a letter to the Right Honourable xxxxx, member of Parliament.* 46 pp. 4to. *London, 1763* The proceedings referred to in the title extended from 1714-1763.

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—See also 333.

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—See also 327.



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410. WATSON. (*See No. 4377.*)

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412. **Wilcke**, Johan Carl. (1732-1796.) *Tal, om magneten, hallet for Kongl. Vetensk. Academien vid Praesidi nedlaggande.* 44 pp. 8vo. Stockholm, Lars Salvius. *Stockholm, 1764*  
Magnetic history with special reference to declination.

413. **L'espion Chinois**; ou, l'envoyé secret de la cour de Pekin, pour examiner l'état présent de l'Europe, traduit du Chinois (par Ange Goudar). 2 vols. 2 plates. 12mo. Cologne. *Cologne, 1764*  
Work of some celebrity though containing little of scientific interest. Vol. i., sympathetic magnetic telegraph, p. 116; vol. ii., appreciation of Descartes, p. 26.

414. **Brugmans**, Anton, (1732-1789.) *Tentamina philosophica de materia magnetica, ejusque actione in ferrum et magnetem.* 4 l.+237 pp. 6 plates. Sm. 4to. Franequerae, Gulielmus Coulon. *Franeker, 1765*  
Propositions on the nature and phenomena of magnetism followed by numerous experiments, including measurements of declination and dip. The author discovered in 1778 the repulsion of bismuth by a magnet.  
—See also 470.

415\*. **Boscovich**, Ruggiero Giuseppe (also Boskovic, Ruder Josip). (1711-1787.) *Dissertatio de lunae atmosphaera.* 1 l.+111 pp. 4to. Vindebonae, Typis Joannis Thomae Nol. de Trattern. *Vienna, 1766*  
The object of the dissertation is to show that the moon has no atmosphere. The author was an eminent Italian Jesuit, astronomer and philosopher.

416. **Gwynn**, John (also Gwyn, or Gwynne). ( ? -1786.) London and Westminster improved, illustrated plans, to which is prefixed a Discourse on publick magnificence with observations on the state of arts and artists in this Kingdom. xiv+132 pp. 4 plates. 4to. London, for the author. *London, 1766*  
Description of the actual state of London with suggested improvements.

417. **Lovett**, R(ichard). (1692-1780.) Philosophical essays in three parts, containing an inquiry into the nature and properties of the electrical fluid. To which is subjoined, by way of Appendix, a clear account of the variation of the needle. (The Appendix is entitled: A brief theory of the North Magnetic Pole and the Mariners' Compass Needle.) 1 l.+xxi pp.+3 l. +525 pp.+23 l. 4 plates. 8vo. Worcester, for the author. *Worcester, 1766*  
Properties of the ether, p. 67; plus and minus electrification, p. 112; Franklin's kite, p. 148; detailed account of *De Romas*' kite experiments, p. 150; needles magnetized, and polarity reversed by jar discharges, p. 409.  
—See also 391.

418. **Poncelet**, (Polycarpe). (Flourished 18th cent..) *La nature dans la formation, du tonnerre et la reproduction des êtres vivans*

vement de vibration, qu'ils conservent pendant un temps sensible; les nerfs ne sont point des cordes tendues, ni des corps rigides. Car dans ce cas, une seule impression momentanée feroit durer les sensations, ce qui repugne à l'expérience. En effet dès qu'on ferme l'œil, dès qu'on bouche l'oreille, les sensations cessent. Au lieu qu'elles continueroient, si les nerfs avoient un mouvement sensible de vibration (\*).

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(\*) Cette supposition paroît confirmée par une expérience assez curieuse. Si l'on joint deux pieces, l'une de plomb & l'autre d'argent, de sorte que les deux bords fassent un même plan, & qu'on les approche sur la langue on en sentira quelque goût, assez approchant au goût de vitriol de fer, au lieu que chaque

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pour servir d'introduction aux vrais principes de l'Agriculture. 2 vols. 3 plates. 12mo. Paris, P. G. LeMercier. *Paris, 1766*  
Causes and effects of lightning and laboratory electricity; use of points discountenanced, p. 117.

419. **Swinden, J(an) H(endrik) van.** (1746-1823.) *De attractione.* 79 pp. 1 plate. 4to. (Inaugural dissertation.) *Lugduni Batavorum, Th. Haak.* *Leyden, 1766*  
Mathematical treatment of certain problems in attraction.  
—See also 476, 496.

420. **Sulzer, (Johann Georg).** (1720-1779.) *Nouvelle théorie des plaisirs, avec des réflexions sur l'origine du plaisir par Mr. Kaestner.* 2 1.+363 pp. 12mo. (no place.) *1767*  
Inquiry into the causes of agreeable sensations; Sulzer discovered *Galvanic taste* by placing his tongue between two plates, one of silver and the other of lead, connected together by a wire. (See p. 155.)

421\*. **Paulian, A(imé) H(enri).** (1722-1801.) *L'électricité soumise à un nouvel examen, dans différentes lettres adressées à M. l'Abbé Nollet. Par l'auteur du Dictionnaire de Physique.* xlviii +286 pp.+1 l. 12mo. *Avignon, Girard & Franc. Seguin.* *Avignon, 1768*  
The first part contains nine letters addressed to Abbé Nollet in which the author defends his views as contained in the article "Electricité" of his *Dictionnaire de Physique*. 3 vols., 1761. In the second part, the principles of the subject are treated in Latin and in accordance with the scholastic method; the author was a French Jesuit.

422. **Priestley, Joseph.** (1733-1804.) *Familiar introduction to the study of electricity.* 51 pp. 7 plates 4to. London, for J. Dodsley. *London, 1768*  
Electrical pencil (positive brush) and star (negative brush), p. 24; Lane's and Kinnersley's electrometers, p. 40; electrical machines, p. 45. The tract purposed to be a "Familiar explication of the fundamental principles of electricity mixing theory with facts and illustrating chiefly those experiments which are the most entertaining," p. 7.

422a.—Second edition. 85 pp.+1 l. 8 plates. 8vo. London, for J. Dodsley. *London, 1769*  
—See also 445, 453, 466, 565, 590, 602, 2459.

423. **Savérien, Alex(andre).** (1722-1805.) *Histoire des philosophes modernes avec leur portrait ou allégorie.* Vol. vi. *Histoire des physiciens.* 12mo. Paris, Librairie Ordinaire. *Paris, 1768*  
Sketch of the life and work of eight physicists including Rohault, Boyle, Desaguliers, s'Gravesande and van Musschenbroek.

424. **Beccaria, G(iovanni) B(attista).** (1716-1781.) *Experimenta, atque observationes quibus electricitas vindex late constituitur, atque explicatur.* 2 1.+66 pp. 1 plate. 4to. *Augustae Taurinorum, ex typographia regia.* *Turin, 1769*  
Numerous experiments in electricity made by the distinguished Italian priest and philosopher.  
—See also 375.

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Reference to the properties of the magnet, ancient authors being freely quoted: pp. 202-207; cause of thunder, p. 191. The original French edition appeared in 1766.

426. **Guyot**, (Edmé-Gilles). (1706-1786.) Nouvelles récréations physiques et mathématiques; contenant ce qui a été imaginé de plus curieux dans ce genre, et ce qui se découvre journellement. 4 vols. 72 plates. 8vo. Paris, Gueffier. *Paris, 1769-1770*  
The suspension of Mahomet's coffin, the suspension of the statue of Arsinoe in an Alexandrian temple, and the sympathetic magnetic-telegraph treated as myths and absurdities.

427.† **Musschenbroek**, Pieter van. (1692-1761.) Cours de physique expérimentale et mathématique. Traduit par Sigaud de la Fond. 3 vols. 4to. Paris, Briasson. *Paris, 1769*  
The first volume of this important text-book on natural philosophy contains one hundred closely printed pages on electricity and magnetism; references frequently given. The translator was himself a distinguished physicist.  
—See also 257.

428. **Volta**, Alessandro. (1745-1827.) De vi attractiva ignis electrici, ac phaenomenis inde pendentibus ad Joanem Bapt. Beccarium dissertatio epistolaris. lxxii pp. 4to. Novo-Comi. Typis Octavii Staurenghi. *Como, 1769*  
This work on the attractive force of electric fire was Volta's first contribution to science. He published it at the age of twenty-four; it is held in esteem.  
—See also 511bis, 570b, 603, 655, 726, 731, 736, 853, 2481.

429. **Ferguson**, James. (1710-1776.) An introduction to electricity in six lectures. 2 l.+140 pp. 3 plates. 8vo. London, for W. Strahan. *London, 1770*  
Experiments illustrating phenomena in electrostatics. The work closes with a chapter on the medical uses of electricity. This is one of the best early treatises on electricity.

429\*a.——Second edition. 2 l.+140 pp. 3 plates. 8vo. London, for W. Strahan. (A reprint.) *London, 1775*

429\*b.——Third edition. 2 l.+140 pp. 3 plates. 8vo. London, for W. Strahan. (A reprint.) *London, 1778*  
—See also 800, 819.

430.† **Nollet**, Jean Antoine. (1700-1770.) L'art des expériences; ou, Avis aux amateurs de la physique, sur le choix, la construction et l'usage des instruments; sur la préparation et l'emploi des drogues qui servent aux expériences. 3 vols. 54 plates. 12mo. Paris, Durand. *Paris, 1770*  
Practical instructions for students' use in constructing physical apparatus; a suggestive and helpful manual.  
—See also 319.

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428. VOLTA. (Reduced.)

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The author describes the electrical experiments of his days and seeks to explain them by the one-fluid theory as propounded by Franklin.

432. **Berdoe, Marmaduke.** ( — - - .) An inquiry into the influence of the electric-fluid in the structure and formation of animated beings. xxxii+183 pp. 4 plates. 8vo. Bath, for the author. *Bath, 1771*  
Effect of electricity on the development of the animal organism; electricity pervades all media, p. 56; identical with the ether, p. 58.

433. [Henley, William.] ( ? -1779.) Theory of electricity. (Manuscript) 4to. *1771*  
This manuscript is an exposition by William Henley, F.R.S., of the theoretical views of electricity held by Major Eeles of Lismore. (See No. 377.)  
—See also 2463.

434\*. **Sigaud de la Fond, (Jean René).** (1740-1810.) Traité de l'électricité; pour servir de suite aux *Leçons de physique*. xxx+413 pp.+1 l. 12 plates. 12mo. Paris. *Paris, 1771*  
Special chapter on the relation between electric and magnetic matter. *Leçons de physique*, of which the present work is a continuation, was published in 1767.  
—See also 455, 505, 543bis, 654.

435. **Symes, Richard.** ( — - - .) Fire analysed; or, The several parts of which it is compounded clearly demonstrated by experiments, and the manner and method of making electricity medicinal and healing confirmed by a variety of cures. vii +87 pp. 8vo. Bristol. *Bristol, 1771*  
Verbose and superficial tract; twenty-one medical cures effected by electrical treatment, p. 59; remarks on the number *seven*, p. 41.

435† bis. **Beccaria, Giambattista.** (1716-1781.) Elettricismo artificiale. 1772.—Della elettricità terrestre atmosferica a cielo sereno. 1775.—Nuovi sperimenti. 1780. viii+439+54+19 pp., plates. 4to. Torino, nella reale stamperia. *Turin, 1772-1780*  
For English translation of the first two parts, see No. 457. The third part refers to investigations on static discharges in oil between the immersed balls of an electroscope. (See No. 392bis, 450.)  
—See also 375.

436. **Kratzenstein, Christian. (Gottlieb).** (1723-1795.) Physikalische Briefe. I. Von dem Nutzen der Electricitaet in der Arzneywissenschaft. II. Beweis, dass die Seele ihren Koerper baue. 4th edition. 102 pp. 1 plate. 12mo. Halle, C. H. Hemmerde. *Halle, 1772*  
Some applications of electricity to medicine. The author was the founder of a system of electro-therapeutics.  
—See also 326.

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437\*. **Lenglet**, du Fresnoy. N(icole). (1674-1755.) Méthode pour étudier l'histoire, avec un catalogue des principaux historiens; accompagné de remarques sur la bonté de leurs ouvrages, et sur le choix des meilleures éditions. Nouvelle édition par Drouet. 15 vols. 12mo. Paris, Debure. *Paris, 1772*  
The author was a learned prelate and *littérateur*; brief history of various countries. Vol. xiv. contains an outline of the history of science and art. The first edition appeared in 1718 under the initials N. L. du F.

438. **(Becket, John Brice)**. (— — —.) An essay on electricity, containing a series of experiments introductory to the study of that science with a view of facilitating its application and extending its utility in medical purposes. xv+151 pp. 8vo. Bristol, for J. B. Becket. *Bristol, 1773*  
The Franklinian theory is adopted throughout the essay. Part ii. treats of the medical effects of electricity. Pointed rods as lightning conductors, p. 133.

439. **Dalla Bella, Joao Antonio**. (1730-1823.) Noticias historicas e practicas à cerca do modo de defender os edificios dos estragos dos raios. 88 pp. 1 plate. 8vo. Lisboa, na regia officina typografica. *Lisbon, 1773*  
Portuguese tract treating of the construction and protective function of lightning-rods. Methods of exploring the air, p. 5; Réaumur's Leyden-jar experiment, p. 14; experiments of de Romas, p. 22.

440. **Dempster, George**. (1735-1818.) Account of the magnetic mountain of Cannay. (New Annual Register, 1773, pp. 149-150.) 8vo. *Edinburgh, 1773*  
Short communication showing how a compass was affected by basaltic rocks. (From Trans. Soc. Antiquaries of Scotland, vol. i.).

441. **Lous, Christian Karl**. (1724-1804.) Tentamina experimentorum ad compassum perficiendum et unicuique usui tam nautico quam terrestri accommodandum; ut et ad virium magneticarum quantitatem explorandam et aestimandam spectantium. iv+130 pp. 8 plates. 4to. Hafniae, Philibert. *Copenhagen, 1773*  
Work of exact, magnetic measurements. Instruments for determining declination, p. 7; a vibrating magnet considered as a pendulum, pp. 35, 97; experiments with vibrating magnets, p. 37; measurements of declination, p. 85; the dipping needle, p. 125.

442. **Mills, John**. (— — —.) An essay on the weather; with remarks on the shepherd of Banbury's rules for judging of its changes; and directions for preserving lives and buildings from the fatal effects of lightning. Second edition. xv+127 +viii pp. 12mo. London, for S. Hooper. *London, 1773*  
Efficiency of pointed conductors, p. 16; Franklin's views adopted, p. 69. First edition appeared in 1770.

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443. **Nairne, Edward.** (1726-1806.) Directions for using the electrical machine as made and sold by E. Nairne. 11 pp. 1 plate. 8vo. *London, 1773*  
Flap of oiled silk, p. 4; Canton's electric amalgam, p. 10. Nairne was the inventor of the electrical machine which bears his name.

444.——Experiments on two dipping-needles, April 21, 1772, which dipping-needles were made agreeable to a plan of the Rev. Mr. Mitchell, and executed for the board of longitude. 7 pp. 1 plate. 8vo. London, Bowyer & Nichols. *London, 1773*  
The axis of a dipping-needle is supported on friction-wheels.  
—See also 484, 513, 518, 2470.

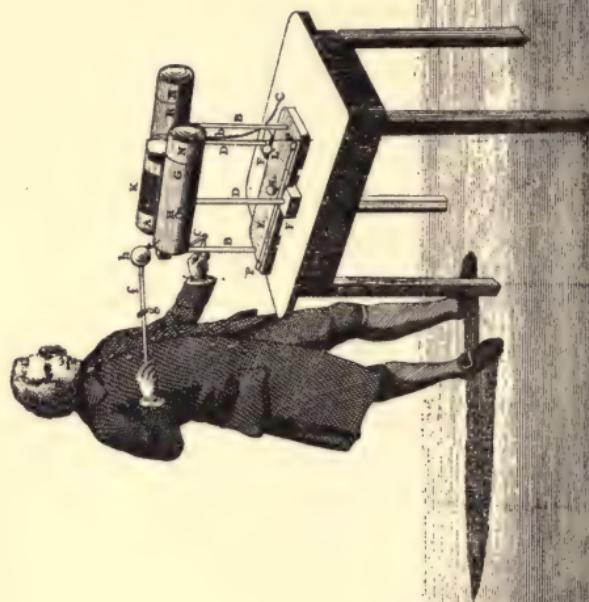
445. **Priestley, J(oseph).** (1733-1804.) An account of a new electrometer, contrived by Mr. William Henley, and of several electrical experiments made by him; in a letter from Dr. Priestley, F.R.S. to Dr. Franklin, F.R.S. 8 pp. 1 plate. 4to. London, W. Bowyer and J. Nichols. *London, 1773*  
This is the "quadrant electrometer" or common electric semaphore of our text-books.  
—See also 422.

446. **Wilson, B(enjamin).** (1708-1788.) Observations upon lightning, and the method of securing buildings from its effects, in a letter to Sir Charles Frederick. 4 l.+68 pp. 4to. London, for Lockyer Davis. *London, 1773*  
The author gives his reasons for differing from the other members of the committee appointed to consider the best method of protecting the Purfleet magazine against lightning. They recommended pointed conductors but Wilson advised conductors with knobs. The appendix contains details of the explosion by lightning of the powder-magazine at Brescia.

446a.——Further observations upon lightning together with some experiments. vii+26 pp. 4to. London, for Lockyer Davis. *London, 1774*  
The author advocates strong anti-Franklinian views.  
—See also 334.

447. **Lovett, R(ichard).** (1692-1780.) The electrical philosopher; containing a new system of physics founded upon the principle of an universal plenum of elementary fire, offered by way of Supplement to the Philosophical Essays by the same author. To which is subjoined a postscript containing strictures upon the animadversions of the Monthly Reviewer on the Essays. 1 l.+290 pp.+10 l. 2 plates. 8vo. Worcester, for the author. *Worcester, 1774*  
Work of interest and speculation on motion, the tides, cohesion and gravity together with contemporary views on electricity and magnetism. Remarks on Symmer's experiments with silk stockings; singular electrical effects obtained by Bridone.

447a.——Second edition. 13 l.+290 pp.+10 l. 2 plates. 8vo. Worcester, for the author. *Worcester, 1777*  
—See also 391.



443. NAIRNE. (Reduced.)

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448. **s'Gravesande**, G(uillaume) J(acob). (Willem Jakob Storm van.) (1688-1742.) *Oeuvres philosophiques et mathématiques rassemblées et publiées par Jean Nic. Seb. Allamand, qui y a ajouté l'histoire de la vie et des écrits de l'auteur.* 2 vols. 29 plates. 4to. Amsterdam, Marc Rey. *Amsterdam, 1774* Tracts on perspective, logic, metaphysics with sketch of the life of the eminent Dutch physicist and philosopher.  
—See also 252.

449. **Toaldo**, Giuseppe. (1719-1797.) *Dell'uso de' conduttori metallici a preservazione degli edifizi contro de' fulmini, nuova apologia colla descrizione del conduttore della pubblica specola di Padova.* xxxii pp. 1 plate. 4to. Venezia, Antonio Zatta. *Venice, 1774*  
Construction of lightning-conductors; also Franklin's letter to de Saussure, 1772. Toaldo held strong Franklinian views and urged the adoption of lightning-conductors for the protection of the public buildings of Venice.

449a.——*Mémoires sur les conducteurs pour préserver les édifices de la foudre.* Traduits de l'Italien avec des notes et des additions par Mr. Barbier de Tinan. x+242 pp. pl. 8vo. Strasbourg, Heitz. *Strasbourg, 1779*  
The author was an earnest advocate for the general use of lightning rods. General considerations on them; views of M. de Saussure of Geneva; description of the lightning-conductors of St. Marc's, Venice; committee on the protection of the powder magazines at Purfleet. Toaldo was appointed to the chair of Astronomy at Padua in 1762.

450. **Beccaria**, Giacomo Battista. (1716-1781.) *Della elettricità terrestre atmosferica a cielo sereno osservazioni.* (Dedicate a S. A. R. il Principe di Piemonte.) 54 pp. 4to. *Turin, 1775* This is the author's famous tract on the normal electricity of the atmosphere. Positive and negative electricity found, p. 4; observations on the electrical charges of clouds, p. 18; origin of atmospheric electricity, p. 32. (See Nos. 392bis, 435bis, 457.)  
—See also 375.

451. **F(olie)**, D. L. (also Follie). (1733-1780.) *Le philosophe sans prétention ou l'homme rare. Ouvrage physique, chimique, politique et moral, par (M. D(e) L(a) F. C-L. de la Folie, négociant).* 349 pp. 1 plate. 8vo. Paris, Clousier. *Paris, 1775* Work of pure imagination: fanciful form of electrical machine, p. 8; pressure due to impact of light, p. 31; smoke driven down chimney by pressure due to light, p. 129.

452. **Kies**, Johann. (1713-1781.) *De effectibus electricitatis in quaedam corpora organica.* 36 pp. 4to. Tuebingae, litteris Sigmundianis. (Inaugural dissertation.) *Tubingen, 1775* Electricity developed in processes of vegetation.

453. **Priestley**, Joseph. (1733-1804.) *History and present state of electricity with original experiments.* Fourth edition, corrected and enlarged. xxxii+691 pp.+6 1. 8 plates. 4to. London, for C. Bathurst. *London, 1775*  
This is the first extensive history of electrical discovery and theory; it is a storehouse of information; first edition, 1767. (See Nos. 508, 581.)

A  
S U R V E Y  
O F  
EXPERIMENTAL  
PHILOSOPHY,  
Considered in its  
PRESENT STATE OF IMPROVEMENT.

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IN TWO VOLUMES.

VOL. I.

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By OLIVER GOLDSMITH, M. B.

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458. GOLDSMITH.

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453a.——Additions to the history and present state of electricity, with original experiments. Second edition. iv+52 pp. 4to. London, for J. Johnson. *London, 1772*  
 Remarks on the electrical work of the author's immediate predecessors and contemporaries together with researches of his own, especially on the energy of discharge of Leyden batteries.

453b.—(French translation.) Histoire de l'électricité; traduite de l'anglois avec des notes critiques. 3 vols. 9 plates. 12mo. Paris, Herissant. *Paris, 1771*  
 The foot-notes of the translator are numerous and anti-Franklinian in substance.  
 —See also 422.

454. **Pringle**, (Sir) John. (1707-1782.) Discourse on the torpedo; delivered at the anniversary of the Royal Society, Nov. 30, 1774. 32 pp. 4to. *London, 1775*  
 The torpedo (electrical fish) considered historically and electrically.

455. **Sigaud de la Fond**, (Jean René). (1740-1810.) Description et usage d'un cabinet de physique expérimentale. 2 vols. 51 plates. 8vo. Paris, Gueffier. *Paris, 1775*  
 Vol. i. Experiments in general physics; vol. ii. Experiments in electricity and magnetism, with numerous illustrations. (See No. 543bis.)  
 —See also 434.

456. (Simmons, John). (— — .) An essay on the cause of lightning and the manner by which the thunder-clouds become possessed of their electricity; to which are added, Plain directions for constructing and erecting safe conductors. 81 pp. 8vo. Rochester, T. Fisher. *Rochester, 1775*  
 The author condemns existing theories and propounds his own, *viz.*, that the electrification of clouds is due to attrition (friction), and that the discharge is always from the clouds down to the earth and never *vice versa*. Fifty pages are devoted to the erection and maintenance of lightning conductors.

457. **Beccaria**, Giacomo Battista. (1716-1781.) Treatise upon artificial electricity, in which are given solutions of a number of interesting electric phenomena, hitherto unexplained; to which is added, An essay on the mild and slow electricity which prevails in the atmosphere during serene weather. iv+457 pp. 11 plates. 4to. London, for J. Nourse. *London, 1776*  
 General treatise of considerable merit on electricity; also three letters on the electricity of the atmosphere in clear, serene weather. (See No. 392bis, 435bis, 450.)  
 —See also 375.

458. **Goldsmith**, Oliver. (1728-1774.) Survey of experimental philosophy considered in its present state of improvement. 2 vols. ill. 8vo. London, for T. Carnan and F. Newbery jun. *London, 1776*  
 Magnetism and electricity written for the general reader by the versatile Irish poet and naturalist.

459. **Le Monnier**, Pierre Charles. (1715-1799.) Lois du magnétisme, comparées aux observations et aux expériences, dans les dif-

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férentes parties du globe terrestre, pour perfectionner la théorie générale de l'aimant et indiquer par les courbes magnétiques, qu'on cherche à la mer sur les cartes réduites. Seconde partie, qui contient les nouvelles recherches sur la situation géographique de l'équateur et des pôles de l'aimant, avec l'art de faire les boussoles. 168+40 pp. 3 maps, 1 plate. 8vo. Paris, Imprimerie Royale. *Paris, 1776-1778*

Inquiry into the distribution of the earth's magnetic lines together with a discussion of the theory of two and of four centers of magnetic force. The work contains considerable magnetic data. Le Monnier was an eminent astronomer and physicist.

460. **Schinz**, Salomon. (1734-1784.) *A Σ Specimen physicum de electricitate.* 38 pp. 4to. Turici, ex officina Gessneriana. (Inaugural dissertation.) *Zurich, 1776*  
Doctor's thesis on electric attraction; atmospheric electricity, electric theories. *Von Kleist* credited with the discovery of the jar condenser, p. 10; *de Romas* and the lightning kite, p. 19.

461. **Marum**, Martin van. (1750-1837.) *Verhandeling over het electrizeeren, in welke de beschryving en afbeelding van ene nieuw uitgevondene electrizeer-machine benevens enige nieuwe proeven uitgedagd en int' werk gestold door den Auteur, en Gerhard Kuyper.* xiv+96 pp. 2 plates. 8vo. Groningen & Amsterdam, Yntema en Tieboel. *Groningen & Amsterdam, 1776*  
General treatise on electricity; electric amalgam, p. 17; new electrical machine, p. 25.  
—See also 532, 560, 572, 587, 761, 2521.

462. **Della Maniera** di preservare gli edifizi dal fulmine. 22 pp. 12mo. Milano, G. Galeazzi. *Milan, 1776*  
Franklin's experiments on atmospheric electricity; use of lightning conductors.

463. **Cavallo**, Tiberio. (1749-1809.) Complete treatise of electricity in theory and practice with original experiments. xvi+ix+412 pp. 3 plates. 8vo. London, for E. and C. Dilly. *London, 1777*  
Original work on electricity. Electrified tourmaline, p. 25; evaporation increased by electrification, p. 65; fogs and snow electrified, p. 72; lightning conductors for buildings and ships, p. 80; jar with movable coatings, p. 325; results of experiments with kites, p. 366 and with pointed conductors, p. 370; portable electroscope, p. 377. Contains extracts from the *Epistola* of Petrus Peregrinus. Cavallo, a London physicist of considerable ability was of Italian origin. (See No. 46.)

463a.——Fourth edition. Containing the practice of medical electricity, besides other additions and alterations. 3 vols. (Vol. iii. containing the discoveries since the third edition.) 6 plates, 8vo. London, for Dilly. *London, 1795*  
—See also 489, 528, 540, 648, 2471.

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464. **Chigi**, Alessandro. (— — .) Lettera ad un amico sopra il fulmine caduto nel di 18 Aprile del corrente anno 1777 nella spranga posta nella torre del Palazzo pubblico della citta di Siena. 16 pp. 8vo. Siena, Luigi e Benedetto Bindi.  
*Siena, 1777*  
Protection of public buildings against lightning recommended.

465. **Kirby**, Thomas. (— — .) Analysis of the electrical fire, setting forth from the lecturer's own experiments, that it neither attracts, nor repels; nor is attracted, or repell'd, by points; or, any other way, is not material nor inherent, in bodies nor in the clouds, etc.; together with an account of an uncommon effect of lightning and dissertation on the thunder clouds. xii+24 pp. 8vo. (Chatham), for the author.  
*(Chatham, 1777)*  
Fire and electricity are not material, p. 11; action of points on the "electric fire," p. 13; curious effect of lightning, p. 16; fireball, p. 19.

466. **Priestley**, Joseph. (1733-1804.) A description of a chart of biography; with a catalogue of all the names inserted in it, and the dates annexed to them. Sixth edition, with improvements. 72 pp. 2 chronological charts. 12mo. London, for J. Johnson.  
*London, 1777*  
This biographical chart is a literary curiosity. The first edition appeared in 1765.  
—See also 422.

467. **Strong**, Adam. (pseud.) The electrical eel; or, *Gymnotus electricus* by A. S. Naturalist. 111+19 pp. 4to. London, for J. Bew.  
*London, 1777*  
An electrical poem of little merit.

468. **The serpent's reply** to the electrical eel. 22 pp. 4to. London, for Smith.  
*London, 1777*  
Poem of doubtful electrical value.

469. **(Beccaria**, Cesare Bonesana). (1738-1794.) An essay on crimes and punishments, translated from the Italian with a commentary attributed to M. de Voltaire, translated from the French. 191 pp. 12mo. Edinburgh, for W. Gordon.  
*Edinburgh, 1778*  
Chapter xlvi. treats of the various branches of science in a general way. The author was a philosophical and political writer of note in his day. The French edition is translated from the Italian by A. Morellet.

470. **Brugmans**, Anton. (1732-1789.) *Magnetismus seu de affinitatis magneticis. Observationes academicae.* viii pp.+3 l. +133 pp. 1 plate. 4to. Lugduni Batavorum, Luzac et Van Damme.  
*Leyden, 1778*  
Effect of moisture and various acids on magnets, p. 35; *diamagnetic* quality of bismuth, discovered by author, p. 131.  
—See also 414.

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471. **Cuypers, C.** (— — .) Exposé d'une méthode par laquelle on rend des disques de verre, destinés à des machines électriques capables d'exciter l'électricité, dans une atmosphère humide, suivi d'une manière de faire de très-bons coussins pour frotter les verres des machines électriques, et de la description d'un électrophore perpetuel, plus parfait que ceux dont on s'est servi jusqu'ici. 38 pp. 8vo. A la Haye, Gosse. *The Hague, 1778*  
General remarks on the hygroscopic qualities of glass.

472. **Fuss, Nicolaus, von.** (1755-1826.) Observations et expériences sur les aimans artificiels principalement sur la meilleure manière de les faire. 38 pp. 2 plates. 4to. St. Petersbourg. Imprimerie de l'Académie Impériale des Sciences. *St. Petersburg, 1778*  
Steel bars magnetized by the methods then in vogue.

473.\* **Lexell, Anders Johann.** (1740-1784.) Réflexions sur le temps périodique des comètes en général et principalement sur celui de la comète observée en 1770. 36 pp. diagrams on 2 plates. 4to. St. Petersbourg, Imprimerie de l'Académie Impériale des Sciences. *St. Petersburg, 1778*  
The period of the comet of 1770—known subsequently as Lexell's *lost comet*—is shown to be 5½ years.

474. **Reimarus, Jo(hann) Alb(ert) Heinr(ich).** (1729-1814.) Vom Blitz. i. Dessen Bahn und Wuerkung auf verschiedene Koerper. ii. Die beschuetzende Leitung durch Metalle erwogen. iii. Die Betrachtung der Wetterschlaege aus elektrischen Erfahrungen erlaeutert wird. liv+678 pp. 12mo. Hamburg, Carl E. Bohn. *Hamburg, 1778*  
Lightning and its effects on various bodies; objections to the use of lightning-rods answered.  
—See also 591.

475. **Steavenson, Robert.** (1756-1828.) De electricitate et operatione ejus in morbis curandis. 35 pp. 8vo. Edinburgh, Balfour & Smellie. (Dissertatio inauguralis.) *Edinburgh, 1778*  
Dissertation on the efficacy of electricity in medicine.

476. **Swinden, Jan Hendrik van.** (1746-1823.) De paradoxo phaenomeno magneticō, magnetem fortius ferrum purum quam alium magnetem attrahere. (Neue Philos. Abhandl. d. Baier. Akad. d. Wiss. Vol. i., pp. 353-388.) 4to. Muenchen. *Munich, 1778*  
Critical study of some of van Musschenbroek's magnetic experiments; inquiry into the nature of magnetic attraction. The author was an original investigator of note.  
—See also 419.

477. **Weber, Joseph.** (1753-1831.) Vom Luftelektrophor. (Neue Philos. Abhandl. d. Baier. Akad. d. Wiss. Vol. i., pp. 171-216.) 2 plates. 4to. Muenchen. *Munich, 1778*  
Description of the author's *linen* electrophorus.  
—See also 486, 538, 732.

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478. (Wilson, Benjamin.) (1708-1788.) An account of experiments made at the Pantheon, on the nature and use of conductors; to which are added, some new experiments with the Leyden phial. Read at the meeting of the Royal Society. 100 pp. 5 plates. 4to. London, for Nourse. *London, 1778*  
 The author was member of the committee appointed in 1772 to report on the best means of protecting the Purfleet powder-magazine against lightning. He reported against pointed conductors. In 1777 he undertook the experimental investigation here detailed from which he inferred the correctness of his earlier views, p. 56.  
 —See also 334.

479†. Bergman, Torbern Olof. (1735-1784.) *Opuscula physica et chemica, pleraque antea seorsim edita, jam ab auctore collecta, revisa et aucta.* Vols. i. to iv. plates. 12mo. Holmiae; Upsaliae, J. Edman; Lipsiae, J. M. Mueller. *Stockholm, Upsala, Leipzig, 1779-1787*  
 Work on chemistry famous in its time. The author was a Swedish chemist of distinction. The work is complete in six volumes; vols. iv to vi were edited after the author's death by Ernest Hebenstreit. Vol. vi contains a full index.

480. Degaulle, Jean Baptiste. (also Degault). (1732-1810.) *Description et usage d'un nouveau compas azimutal.* vii+52 pp. 1 plate. 12mo. *(Havre, 1779)*  
 Compass for determining the altitude of the sun at any time of the day.

481. Franklin, Benjamin. (1706-1790.) Political, Miscellaneous and Philosophical Pieces; Arranged under the following Heads, and Distinguished by Initial Letters in each leaf; General Politics; American Politics before the Troubles; American Politics during the Troubles; Provincial or Colony Politics; and Miscellaneous and Philosophical Pieces; now first collected, with explanatory plates, notes and an index to the whole. xi+567 pp. 3 plates. 7 portraits. 8vo. London, for J. Johnson. *London, 1779*  
 Paper on pointed conductors read before the Purfleet Committee, 1772; also conjectures on the nature of the aurora borealis with illustrations. This collection was edited by Benjamin Vaughan who, for many years, was an intimate friend and correspondent of Franklin.  
 —See also 367.

482. Lichtenberg, Geo(rg) Christ(oph). (1741-1799.) *De nova methodo naturam ac motum fluidi electrici investigandi.* Commentatio prior. pp. 168-180. 3 plates. Commentatio posterior. pp. 65-79. 2 plates. 4to. (Commentationes Soc. Reg. Sci. Goettingensis.) *(Gottingen, 1779)*  
 This work describes the author's discovery of the double electrophorus (*i. e.*, positive and negative electrification existing in juxtaposition); experiments on *dust figures* with numerous illustrations, p. 176.

483. Marat, (Jean Paul). (1744-1793.) *Découvertes sur le feu, l'électricité et la lumière, constatées par une suite d'expériences*

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nouvelles. Seconde édition. 31.+38 pp. 8vo. Paris, De Clousier.

Paris, 1779

Series of 120 experiments, mostly on the properties of flame. The author, the notorious demagogue of the French Revolution, was a physicist of some ability, but characteristically bitter in his attacks on theories that did not agree with his own. The other scientific writings of Marat are as follows: *Recherches physiques sur l'électricité* (see No. 509). *Mémoire sur l'électricité médicale* (see No. 524). *Recherches physiques sur le feu* (202 pp., 1780); *Découvertes sur la lumière* (141 pp., 1780); *Notions élémentaires d'Optique* (44 pp., 1784); . . . . *Les aeronauts et l'aérostation* (39 pp., 1785); *Optique de Newton, traduction nouvelle* (2 vols., 192+308 pp., 1787); *Nouvelles découvertes sur la lumière* (324 pp., 1780). From 1765 to 1777 Marat lived in England, where he published *An essay on the human soul* (1772); *A philosophical essay on man* (1773); *The chains of slavery* (259 pp., 4to, 1774), and two essays on medical subjects (both 1775) also written in English. In 1775 the University of St. Andrews conferred on Marat the degree of Doctor of Medicine. The numerous books he published prior to the French Revolution were presumably all printed at the author's expense, thus indicating that his income as a physician was considerable.

—See also 509, 524.

484. **Nairne, Edward.** (1726-1806.) Experiments on electricity, being an attempt to shew the advantage of elevated pointed conductors. Read at the Royal Society, June 18th and 25th, 1778. 40 pp. 4 plates. 4to. London, J. Nichols. *London, 1779*

This pamphlet is one of several that were occasioned by the famous controversy of *Points vs. Knobs* begun in 1772 by Benjamin Wilson. Franklin's views were supported by Cavendish and finally adopted.

—See also 443.

485. **Stanhope, Charles Viscount Mahon.** (Third Earl). (1753-1816.) Principles of electricity, containing divers new theorems and experiments, together with an analysis of the superior advantages of high and pointed conductors. xiv+263 pp. 6 plates. 4to. London, for P. Elmsley. *London, 1779*

Descriptions of seventy-one experiments, with comments. The *return stroke* and function of pointed conductors explained at considerable length.

485a.——(French translation.) *Principes d'électricité, contenant plusieurs théorèmes appuyés par des expériences nouvelles, traduit par l'abbé N. - - - (Needham).* 3 l.+250 pp. pls. Londres & Bruxelles, Flon. *London, Brussels, 1781*

486. **Weber, Joseph.** (1753-1831.) *Beschreibung des Luftelektrophors.* 86 pp. 12mo. Augsburg, Klett. *Augsburg, 1779*

Description of his important linen electrophorus together with numerous experiments which were made with it.

—See also 477.

487†. **Wieglob, Johann Christian.** (1732-1801.) *Die natuerliche Magie aus allerhand belustigenden und nuetzlichen Kunststuecken bestehend.* iv+416 pp.+5 l. 9 plates. 8vo. Berlin, Nicolai. *Berlin, 1779*

Numerous experiments in electricity, magnetism, chemistry, and mechanics.

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488.† **Birch, John.** (1745-1815.) Considerations on the efficacy of electricity, in removing female obstructions. To which is now added a description of the manner of applying it. Second edition. xv+60 pp. 8mo. London, Cadell. *London, 1780*  
Medical applications of the "electric shock."  
—See also 576, 633 bis.

489. **Cavallo, Tiberio.** (1749-1809.) Essay on the theory and practice of medical electricity. xvi+112 pp. 1 plate. London, for the author. *London, 1780*  
Details of the successful application of electricity to the cure of diseases; work of value.  
—See also 463.

490. (Coulomb, Charles Augustin). (1736-1806.) Recherches sur la meilleure manière de fabriquer les aiguilles aimantées. (Mém. math. et phys. présentés à l'Acad. Sc. par divers Savans. Vol. ix., pp. 165-264.) 5 plates. 4to. *(Paris, 1780)*  
Various methods of making magnetic needles, by the distinguished electrical investigator.  
—See also 521, 610, 2352, 2507.

491.\* **Gallitzin, Dmitri Alexewitsch.** (1738-1803.) Sendschreiben an die kaiserliche Akademie der Wissenschaften zu St. Petersburg ueber einige Gegenstaende der Electricitaet. 56 pp. 3 plates. 8vo. Muenster, Perrenon. *Munster, 1780.*  
Three letters on the "attractive" power of points and on the electricity of the atmosphere.

492. **Huebner, Lorenz.** (1753-1807.) Abhandlung ueber die Analogie der electrischen und magnetischen Kraft. (Neue Philos. Abhandl. d. Baier. Akad. d. Wiss. Vol. ii., pp. 353-384). 4to. Muenchen. *Munich, 1780*  
Papers on the analogies between electric and magnetic forces of attraction and repulsion. These include the originals of the three prize essays of No. 496a.

493. **Lyon, John.** (1734-1817.) Experiments and observations made with a view to point out the errors of the present received theory of electricity; and which tend in their progress to establish a new system, on principles more conformable to the simple operations of nature. xxiv+280 pp. 2 plates. 4to. London, for the author. *London, 1780*  
Franklin's theory of the Leyden jar disproved, ch. vi.; also numerous experiments tending to prove the correctness of the author's views.  
—See also 571.

494. **Steiglechner, Coelestin.** (1738-1819.) Beantwortung der Preisfrage ueber die Analogie der Electricitaet und des Magnetismus. (Neue Philos. Abhandl. d. Baier. Akad. d. Wiss. Vol. ii., pp. 229-350.) 3 plates. 4to. Muenchen. *Munich, 1780*  
Electricity and magnetism contrasted. (See Nos. 492, 496a.)

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495. **Turini, Pietro.** (— — .) Considerazioni intorno all' elettricità delle nubi, ed al modo di applicare i conduttori alle fabbriche, e di preservare dal fulmine i depositi della polvere. 68 pp. 4to. Venezia, C. Palese. *Venice, 1780*  
The electricity of clouds; protection afforded by lightning-rods. The author holds to the Franklinian theory.

496. **Swinden, Jan Hendrik van.** (1746-1823.) Dissertatio de analogia electricitatis et magnetismi. (Neue Philos. Abhandl. d. Baier. Akad. d. Wiss. Vol. ii., pp. 1-126.) 2 plates. 4to. Muenchen. *Munich, 1780*  
Thesis on the analogy between the nature and phenomena of electricity with those of magnetism. (See Nos. 492, 494, 496a.)

496<sup>†a</sup>.——Recueil de mémoires sur l'analogie de l'électricité et du magnétisme, couronnés et publiés par l'Académie de Bavière. Traduits du Latin et de l'Allemand, augmentés de notes, et de quelques dissertations nouvelles. (Presentation copy from author to C. Bonnet.) 3 vols. 8vo. La Haye, Librairies Ass-socies. *The Hague, 1784*  
Work of considerable originality in which the laws and phenomena of magnetism and electricity are compared in detail, theories discussed and the views of Mesmer on animal magnetism criticized. The collection comprises the following titles: 1. Van Swinden's prize-essay on the analogy between electricity and magnetism. 2. Steiglechner's prize-essay on the analogy between electricity and magnetism. 3. Aepinus' remarks on the above essays. 4. Huebner's prize-essay on the analogy between electricity and magnetism. 5. Mesmer's reflections on animal electricity. 7. Van Swinden's essay on the irregular movements of the magnetic needle.

497.——Mémoire sur les observations météorologiques faites en Franeker en Frise, pendant le courant de l'année 1779. xxiv. + 336 pp. 8vo. Amsterdam, Mare-Michel Rey. *Amsterdam, 1780*  
Observations on the aurora borealis and its disturbing effect on declination magnets.  
—See also 419.

498. **Court de Gébelin, (Antoine).** (1725-1784.) Monde primitif, analysé et comparé avec le monde moderne considéré dans son génie allégorique et dans les allégories auxquelles conduisit ce génie, etc. Vol. i. Remplies de découvertes intéressantes. (Complete in 9 vols.), 4to. Paris, chez l'autheur. *Paris, 1781*  
Work of erudition: the Phenicians credited with a knowledge of the compass, p. 54.

499. **Gabler, Matthias.** (1736-1805.) Theoria magnetis. 144 pp. 1 plate. 12mo. Ingolstadii, J. W. Kruel. *Ingoldstadt, 1781*  
Inquiry into the nature of magnetism and magnetic force: declination and dip discussed at some length and tables given.

500. **Jones, William.** (1726-1800.) Physiological disquisitions; or, Discourses on the natural philosophy of the elements: i.

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On matter. ii. On motion. iii. On the elements. iv. On fire. v. On air. vi. On sound. vii. On fossil bodies. viii. On physical geography; or, the natural history of the earth. ix. On the weather. 2 l.+xxvii+627 pp. 9 plates. 4to. London.

*London, 1781*

Slight references are made to lightning and the aurora borealis, p. 566.

—See also 406.

501. **Lacépède**, Bernard-Germain Etienne de Laville. (1756-1825.) *Essai sur l'électricité naturelle et artificielle.* 2 vols. 8vo. Paris, Didot jeune.

*Paris, 1781*

The nature of electricity and its effect; the electrophorus, the Leyden jar magnetism; effects of electricity on vegetation and on comets; the zodiacal light and aurora borealis.

502. **Legrand d'Aussy**, Pierre Jean Baptiste. (1737-1800.) *Fabliaux ou contes du xii et du xiii siècle, fables et romans du xiii, traduits, ou extraits d'après divers manuscrits du temps; avec des notes historiques et critiques, et les imitations qui ont été fait de ces contes, depuis leur origine jusqu'à nos jours. Nouvelle (seconde) édition, augmentée d'une dissertation sur les Troubadours.* 5 vols. 12mo. Paris, chez Eugene Onfroy.

*Paris, 1781*

Text of the celebrated poem of *Guyot de Provins* on the magnet, written in the 12th century. Vol. ii., p. 185. (See No. 594.)

503. **Leidenfrost**, Ludwig Christoph. (— — .) *Miscellanea experimenta circa electricitatem.* 36 pp. 4to. Duisburgi ad Rh., Fr. Ad. Benthon. (Inaugural dissertation.)

*Duisburg, 1781*

Views on electrical theory.

504. **Maggiotto**, Francesco. (— — .) *Lettera all' illustre professore Giuseppe Toaldo, sopra una nuova construzione di macchina elettrica.* xii pp. 1 plate. 8vo. (Venice, 1781) Pamphlet with illustrations of a new frictional machine.

505. **Sigaud de la Fond**. (Jean René.) (1740-1810.) *Précis historique et expérimental des phénomènes électriques depuis l'origine de cette découverte jusqu'à ce jour.* xvi+742 pp. 9 plates. 8vo. Paris, Demonville, (1781) Work of merit in which the phenomena and laws of electricity and magnetism are discussed at length; electric and magnetic phenomena compared; application to the cure of disease; historical development.

505a.— —Seconde édition. xvi pp.+2 l.+624 pp.+2 l. 10 plates. 8vo. Paris, rue et hotel Serpente. (Paris, 1785)

—See also 434.

506. **T(houvenel**, Pierre). (1747-1815.) *Mémoire physique et médicinal, montrant des rapports évidens entre les phénomènes de la baguette divinatoire, du magnétisme et de l'électricité.* 304 pp. 8vo. Londres et Paris, chez Didot, jeune.

*London & Paris, 1781*

Fancied relations between magnets and the *divining rod*.

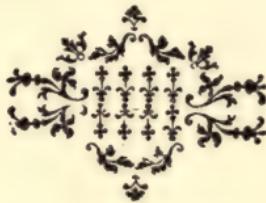
# RECHERCHES PHYSIQUES SUR L'ÉLECTRICITÉ;

*Par M. MARAT, Docteur en Médecine, &  
Médecin des Gardes du Corps de Monseigneur  
le Comte d'ARTOIS.*

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CATALOGUE OF WHEELER GIFT

506a.— —Second mémoire sur le même sujet. Avec des éclaircissements sur d'autres objets qui y sont relatifs. Par M. T. . . 268 pp. 8vo. Londres et Paris, chez Didot, jeune.

Paris, 1784

The author seeks to employ what he calls a "neuro-electric" sense to the discovery of underground water-sources; use of the divining rod.

507. **Cuthbertson**, John. (— — — .) *Algemeene eigenschappen van de electriciteit, onderrichting van de werktuigen en het neemen van proeven in dezelve.* Second edition. 3 vols. 13 plates. 8vo. Amsterdam, Pieter Hayman.

Amsterdam, 1782-1794

Description of experiments common at the time in static electricity; aurora borealis, Part II, p. 43; a new electrical machine, Part III. One of the first, co-operating with Van Troostwijk, to decompose binary compounds.

—See also 681.

508. **Hooper**, W(illiam). (fl. 1770.) *Rational recreations, in which the principles of numbers and natural philosophy are clearly and copiously elucidated, by a series of easy, entertaining, interesting experiments.* Among which are all those commonly performed with cards. By W. Hooper. Second edition. 4 vols. 65 plates. 8vo. London, for L. Davis.

London, 1782-1783

Chiefly a compilation from writers on recreative philosophy. The electrical experiments described in vol. iii. are mostly from Priestley's "History of Electricity." (See No. 453.) Plate i. gives an illustration of Priestley's machine which was occasionally turned by a windmill placed on the top of the house, p. 16. The first edition appeared in 1774.

509. **Marat**, (Jean Paul). (1743-1793.) *Recherches physiques sur l'électricité.* viii+461 pp. 5 plates. 8vo. Paris, de l'Imprimerie de Clousier.

Paris, 1782

Accepted theories are attacked and 214 experiments described which are held to prove the author's own theories. Many complimentary references are, however, made to Franklin.

—See also 483.

510. **Nicholson**, William. (1755-1815.) *An introduction to natural philosophy.* Illustrated with copper plates. 2 vols. 25 plates. 8vo. London, for J. Johnson.

London, 1782

Vol. ii. contains chapters on magnetism and electricity.

—See also 699, 2490.

511. **New thoughts** on medical electricity; or, *An attempt to discover the real uses of electricity in medicine, in two letters to a friend.* 48 pp. 8vo. Sevenoaks, Clout, jr.

Sevenoaks, 1782

Remarkable cures effected by electricity; effects of electrification on the human system.

511bis. **Volta**, A(lessandro). (1745-1827.) *Del modo di render sensibilissima la più debole elettricità sia naturale, sia artificiale.* (Philos. Trans. Roy. Soc., Vol. 71, pp. 237-280.) 4to.

London, 1782

Description of the author's condensing *electroscope*.

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511bis a.——(English translation.) Of the method of rendering very sensible the weakest natural or artificial electricity. (Philos. Trans. Roy. Soc., Vol. 72, pp. vii–xxxiii.) 4to London, 1782  
—See also 428.

512. Behn, Friedrich Daniel. (1734–1804.) Beschreibung einiger merkwuerdigen Nordlichter. 127 pp. 12mo. Luebeck, C. G. Donatius. Lubeck, 1783  
The aurora borealis as seen by the author. The appendix has observations on the solar eclipse of 1764, and the transit of Venus of 1769.

512bis. Bertholon, (Nicole). (1742–1800.) De l'électricité des Végétaux . . . Avec des figures en taille-douce. 468 pp., 3 plates. 8vo. Lyon, chez Bernuset. Lyons, 1783  
The author states that this work may be regarded as a continuation of his *De l'électricité du corps humain* (see No. 533). Experiments to determine the effect of static electricity on the growth of plants are described.  
—See also 533, 539.

513. Blagden, (Sir) C(harles) (1748–1820.) and E(dward) Nairne. (1726–1806.) Proceedings relative to the accident by lightning at Heckingham. 26 pp. 6 plates. 4to. London, Nichols. London, 1783  
The building referred to had eight pointed conductors; the views show the conductors (full size) and the manner in which they were joined together.  
—See also 443.

514. Indagine, (Innocentius Libertus ab) pseud. (i.e. Johann Ludolph Jaeger). (1728?–1787.) Philosophisch—und physikalischer Zeitvertreib in 'einigen sonderbaren Materien, zu weiterer Betrachtung in den Nebenstunden, fuer die Naturforscher ausgefertiget und ans Licht gestellet von dem Naturkundiger. 308 pp. 12mo. Nuernberg, J. A. Stein. Nuremberg, 1783  
Recreative philosophy; electric experiments, pp. 100–124; magnetic experiments, pp. 129–168.

515. Kuehn, Carl Gottlob. (1754–1840.) Geschichte der medizinischen und physikalischen Electricitaet, und der neuesten Versuche, die in dieser Wissenschaft gemacht worden sind. 2 vols. 6 plates. 8vo. Leipzig, Weygand. Leipzig, 1783–1785  
Principles of electricity; electrical machines; application for curative purposes. Franklin's theory of the Leyden-jar discussed at length; lightning-rods; atmospheric electricity. Vol. ii. is also known under the title: Versuch einer vollstaendigen Geschichte der medizinischen Electricitaet, oder von der Anwendung der Electricitaet auf die Heilkunde. In 1796–1797 a continuation appeared: Die neuesten Entdeckungen in der physikalischen und medizinischen Electricitaet.

516. Ledru, N(icolas) P(hilippe). (1731–1807.) Rapport de MM. Cosnier, Maloet, Darcet, Philip, Le Preux, Desessartz et Paulet. Sur les avantages reconnus de la nouvelle methode d'administrer l'électricité dans les maladies nerveuses particulièrement dans l'épilepsie et dans la catalepsie, par M. Le-

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dru, dit Comus. Ce rapport est précédé de l'aperçu du système de l'auteur sur l'agent qu'il emploie et des avantages qu'il en a tirés. Imprimé par ordre et aux frais du gouvernement. 21.+115 pp. 8vo. Paris, C. D. Pierres.

Paris, 1783

Medical effects of electricity on nervous disorders as claimed by the author.

517. **Milner, Thomas.** (1719-1797.) Experiments and observations in electricity. xvi+111 pp. 2 plates. 8vo. London, for T. Cadell. London, 1783

Peltier's electroscope anticipated, p. 35; Franklin's "ice-pail" experiment, p. 99; steel magnetized by lightning, p. 108. This is "one of the rarest electrical tracts, which I know of—and well worthy of perusal. I have met with only two copies after 38 years of diligent search." (Latimer Clark, July, 1888.)

518. **Nairne, (Edward).** (1726-1806.) The description and use of Nairne's patent electrical machine; with the addition of some philosophical experiments and medical observations. 62 pp. 5 plates. 8vo. London, for Nairne. London, 1783  
This machine, described in text-books, was originally designed for medical purposes.

518a.——Another edition. 68 pp. 5 plates. 8vo. London, for Nairne. London, 1787

—See also 443.

519.\* **Adams, George (the younger).** (1750-1795.) Essay on electricity, in which the theory and practice of that useful science are illustrated by a variety of experiments; to which is added an Essay on magnetism. xvi+367 pp. 6 plates. 8vo. London, for the author. London, 1784

This is a collection of electrical experiments. The *double burr*, p. 119; sewing needle magnetized and magnet demagnetized by Leyden-jar discharge, p. 120; Wilcke's electrophorus of 1762, p. 170; Beccaria on atmospheric electricity, p. 205; Cavallo's atmospheric electroscope, p. 221.

519†a.——An essay on electricity, explaining the principles of that useful science; to which is added a letter to the author from John Birch on the subject of electricity. Fourth edition. xi+588 pp. 6 plates. 8vo. London. London, 1792

Experiments bearing on all known electric phenomena with explanations according to current theories. Bennet's original *electroscope*; Nicholson's *doubler*; Volta's and Wilcke's electrophorus; medical electricity. The illustrations, 128 in number, are of interest.

519b.——Fifth edition, with corrections and additions by William Jones. xii+594 pp. 6 plates. London, W. & S. Jones. London, 1799

520. **Cassini, (Jean Dominique).** (1748-1845.) Observations sur les variations diurnes de l'aiguille aimantée. (Lettre à l'auteur

CATALOGUE OF WHEELER GIFT

du Journal de Physique.) 64 pp. 2 plates. 4to. Paris, L. P. Courset. *Paris, 1784*  
 Detailed description of needles used for determining magnetic declination; declination in Paris from 1666, in which year it was zero. Cassini was one of the leading astronomers of his time.

521. **Coulomb**, (Charles Augustin.) (1736-1806.) Recherches théoriques et expérimentales. Sur la force de torsion et sur l'électricité des fils métalliques. (Mém. de l'Acad. Sci. pp. 229-269.) 2 plates. 4to. *Paris, 1784*  
 Classic paper by the eminent French engineer and physicist on the coefficient of torsion of wires, in which it is shown that the *force* of torsion is proportional to the *angle* of torsion.  
 See also 490.

522.† **Gardini**, Giuseppe Francesco. (1740-1816.) De influxu electricitatis atmosphericae in vegetantia. xviii+157 pp. 8vo. Augustae Taurinorum. *Turin, 1784*  
 Numerous observations on atmospheric electricity in its relation to the time of day and state of weather.

523. **Landriani**, Marsiglio. (?-1816?) Dell' utilità dei conduttori elettrici. Dissertatione. xxiv+304 pp. 1 plate. 8vo. *(Milan, 1784)*  
 Function of lightning conductors. Natural and artificial electricity, p. 11; Franklin's experiments, p. 43; construction of a lightning-rod, p. 78; objections answered; letters from de Saussure, Toaldo and others.

524. (Marat, Jean Paul.) (1744-1793.) Mémoire sur l'électricité médicale. 8+111 pp. 8vo. Paris, Méquignon. *Paris, 1784*  
 This is one of the early books on *medical* electricity. The author minutely describes a great number of applications that he made of positive and negative electricity on himself and others. He refers to persons killed by lightning and adds many curious observations on cats, dogs and pigeons which he electrocuted.  
 —See also 483.

525. **Tiraboschi**, G(irolamo.) (1731-1794.) Histoire de la littérature d'Italie tirée de l'Italien de Tiraboschi et abrégée par Antoine Landi. 5 vols. 8vo. Berne, De Burne l'aîné. *Bern, 1784*  
 This translation is an abridgment of the great work of the Italian Jesuit and bibliographer on the literature of Italy; it contains many references to the history of the mariner's compass.

526.\* **Mémoires** concernant diverses questions d'astronomie, de navigation et de physique. xvi+32 pp. plates. 4to. Paris. *Paris, 1784*  
 One of the papers contains observations on the accepted theory of winds; a second, observations on the annual change in magnetic declination made at Issy near Paris in 1779.

527. **Bruno de** (Introducteur des Ambassadeurs du Cte. d'Artois) (—.) Recherches sur la direction du fluide magnétique dédiés à Monsieur, frère du Roi. viii. 206 pp. 8 plates. 12mo. Amsterdam, chez Gueffier. *Amsterdam, 1785*  
 An effort to show that the accepted theories in magnetism are untenable

# RECHERCHES

## THÉORIQUES ET EXPÉIMENTALES

*Sur la force de torsion, & sur l'élasticité des fils de métal : Application de cette théorie à l'emploi des métaux dans les Arts & dans différentes expériences de Physique : Construction de différentes balances de torsion, pour mesurer les plus petits degrés de force. Observations sur les loix de l'élasticité & de la cohérence.*

Par M. COULOMB.

### I.

Ce Mémoire a deux objets ; le premier, de déterminer la force élastique de torsion des fils de fer & de laiton, relativement à leur longueur, à leur grosseur, & à leur degré de tension. J'avois déjà eu besoin, dans un Mémoire sur les Aiguilles aimantées, imprimé dans le neuvième volume des Savans étrangers, de déterminer la force de torsion des cheveux & des soies ; mais je ne m'étois point occupé des fils de métal, parce que l'objet utile à mes recherches, n'étoit pour lors que de choisir, à forces égales, les suspensions les plus flexibles, & que j'avois trouvé que les fils de soie avoient incomparablement plus de flexibilité que les fils de métal. Le second objet de ce Mémoire, est d'évaluer l'imperfection de la réaction élastique des fils de métal, & d'examiner quelles sont les conséquences que l'on en peut tirer, relativement aux loix de la cohérence & de l'élasticité des corps.

521. COULOMB. (Reduced.)

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because based on erroneous or faulty experiments. There is but one universal fluid (*the ether*) susceptible of modification, it suffices to explain all natural phenomena, p. 196. The diagrams of the magnetic field are worthy of notice.

528. **Cavallo**, (Tiberio). (1749-1809.) *Magnetical experiments and observations.* (Phil. Trans. Roy. Soc., Vol. 72, pp. 62-80.) 4to.

*London, 1785*

The Bakerian lecture, 1785 (founded by Henry Baker, Esq.) The author finds that *brass* "which is often magnetic does not owe its magnetism to iron but to some particular configuration of its component particles, occasioned by the usual method of hardening it, which is by hammering." —See also 403.

529. **Franklin**, Benjamin. (1706-1790), and others. *Report of Dr. Benjamin Franklin, and other Commissioners, charged by the King of France, with the examination of the Animal Magnetism as now practiced at Paris. Translated from the French with an Historical Introduction.* xx+108 pp. 12mo. London, for Johnson.

*London, 1785*

The Commissioners found that "the existence of the fluid (animal magnetism) is *absolutely destitute of proof*," p. 106.

—See also 367.

530. **Kratzer**, Joseph Anton, (1748-1796.) (also Krazer). *Praktische Ausmessung und Berechnung der Felder auf eine sehr einfache und fassliche Art entworfen.* 31 pp. tab. 12mo. Graz. Ferstl.

*Gratz, 1785*

A short treatise on mensuration.

531. **M(ercier de St. Léger**, Barthélemy). (1734-1799.) *Notice raisonnée des ouvrages de Gaspar Schott, contenant des observations curieuses sur la Physique expérimentale, l'Histoire naturelle et les arts par M. Abbé M - - - (Barthélémy Mercier).* 108 pp. 12mo. Paris, chez Lagrange.

*Paris, 1785*

Reference is made, p. 28 to Porta's "Magia Naturalis"; (See No. 47); magnetic signaling is condemned as absurd, p. 128.

532. **Marum**, Martin van. (1750-1838.) *Beschryving einer ongemeen groote electriseer-machine, geplaatst en Tevler's Museum te Haarlem, en van de proefneemingen met dezelve in't werk gesteld.* 2 vols. 17 plates. 4to. Haarlem, Joh. Enschede.

*Harlem, 1785-1787*

The author's great electrical machine described, p. 2; his mammoth Leyden battery, p. 154; deflagration of metals, p. 164; magnetizing effect of powerful discharges, p. 168. Contains some of the earliest experiments of the action of electric discharge on gases and of the electric smelting of metals. The book is in French and in Dutch; the plates are of interest.

—See also 461.

533.† **Bertholon**, (Nicole). (1742-1800.) *De l'électricité du corps humain dans l'état de santé et de maladie. Ouvrage couronné par l'Académie de Lyon, dans lequel on traite de l'électricité de l'atmosphère, de son influence et des effets sur l'économie animale, des vertus médicales de l'électricité, des découvertes*

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modernes, et des différentes méthodes d'électrisation; avec un grand nombre de figures en taille-douce. Second edition. 2 vols. 6 plates. 8vo. Paris, Croulbois. *Paris, 1786*

In this second edition of a work that interested scientific as well as medical men, there is much about atmospheric electricity and its effects on the human system; also applications of positive and negative electricity to the cure of diseases. Historical frictional machines, vol. ii., p. 214.

—See also 512bis.

534. **Bohnenberger**, Gottlieb Christian. (1732-1807.) Fortgesetzte Beschreibung einer sehr wirksamen Elektrisir-Maschine von ganz neuer Erfindung und einiger zur elektrischen Praxis gehoerigen Werkzeuge mit angehaengten Versuchen. 110 pp. 6 plates. 12mo. Stuttgart, bey Johann B. Mezler.

*Stuttgart, 1786*

Illustrated description of a new electrical machine with prime conductor carrying rows of points.

—See also 581.

535. **Elliot**, John. (1747-1787.) Elements of the branches of natural philosophy connected with medicine, viz. chemistry, optics, acoustics, hydrostatics, electricity, and physiology. Second edition. xvi+331 pp. 2 plates, 2 tables. 8vo. London, for J. Johnson. *London, 1786*

A short chapter on electricity beginning p. 199.

536. **Silberschlag**, J(ohann) E(saias). (1721-1791.) Systema inclinationis et declinationis utriusque acus magneticae. (Mém. de l'Acad. d. Sc. Berlin, pp. 87-148.) 11 plates, 4to.

*Berlin, 1786-1787*

Remarks on the use of the dip and declination needles.

537. **Tressan**, (Louis Elisabeth de la Vergne). (1705-1783.) Essai sur le fluide électrique considéré comme agent universel. 2 vols. 12mo. Paris, chez Buisson. *Paris, 1786*

Discursive work in which electricity is connected with the processes of the animal and vegetable worlds as well as with most natural phenomena from lightning and volcanic action to the aurora borealis and zodiacal light.

538. **Weber**, Joseph. (1753-1831.) Ueber den Werth der Luftmaschinen. 44 pp. 3 plates. 12mo. Dillingen & Ulm, Wohler.

*Dillingen & Ulm, 1786*

A discourse on the art of ballooning.

—See also 477.

539.\* **Bertholon**, (Nicole). (1742-1800.) De l'électricité des météores. Ouvrage dans lequel on traite de l'électricité naturelle en général et des Météores en particulier. 2 vols. 6 plates. 8vo. Paris, chez Croulbois. *Paris, 1787*

Natural phenomena connected with electricity including earthquakes, volcanoes, hail, and waterspouts. Efficacy of conductors with points and with knobs. Details of experiments by d'Alibard, de Romas, Beccaria and others. Pernicious practice of ringing bells on the approach of a storm,

CATALOGUE OF WHEELER GIFT

Vol. i., p. 170; cases of polarity-reversal of compass needles in a storm, vol. ii., p. 373.

—See also 512bis.

540. **Cavallo**, Tiberio. (1749-1809.) Treatise on magnetism in theory and practice, with original experiments. xii+343 pp. 2 plates. 8vo. London, for T. Cavallo. *London, 1787*  
Discovery of the directive property of the magnet, p. 45; claims of the Chinese, p. 47; discovery of declination, p. 50; magnetic properties of brass, p. 283; of platinum, p. 300; of red-hot iron, p. 311; causes of magnetic declination, p. 324. (See No. 2645.)

540a.——Third edition, with a supplement. xi+325 pp. 3 plates. 8vo. London, Jones. *London, 1800*  
The supplement contains the Latin text of parts of the letter of *Peregrinus* on the magnet, A. D. 1269, accompanied by a free translation. (See No. 46.)

540b.——(German translation). Theoretische praktische Abhandlung der Lehre vom Magnet. Aus dem Englischen. 206 pp. 2 plates. 8vo. Leipzig, Schwickert. *Leipzig, 1788*  
—See also 463.

541. **Hauey**, René Just. (1743-1822.) Exposition raisonnée de la théorie de l'électricité et du magnétisme, d'après les principes de M. Aepinus. xxvii+238 pp. 4 plates. 8vo. Paris, chez la veuve Desaint. *Paris, 1787*  
Work on electrical theory by Abbé Hauey, celebrated French mineralogist and physicist: he adopts the one-fluid theory as modified by Aepinus; Coulomb's torsion-balance to establish the laws of electric and magnetic attraction and repulsion, pp. 39, 184; electrification of tourmaline, ruby, topaz, p. 95; return shock, p. 105.  
—See also 684.

542. **Kitz**, Friedrich Casimir. (— — —.) Dissertatio sistens electricitatis in medicina usum et abusum. 92 pp. 12mo. Goettingae (Inaugural dissertation.) *Gottingen, 1787*  
Dissertation on electric force, atmospheric electricity; medical applications of electricity, with *bibliography*.

543. **Lowndes**, Francis. (— — —.) Observations on medical electricity containing a synopsis of all the diseases in which electricity has been recommended or applied with success; likewise pointing out a new and more efficacious method of applying this remedy by electric vibrations. 51 pp. 8vo. London, D. Stuart. *London, 1787*  
Synopsis of complaints in which electrical application had been found to be of some advantage.

543† bis. **Sigaud de la Fond**, (Jean René). (1740-1810.) Élémens de physique théorique et expérimentale, pour servir de suite à la description & l'usage d'un cabinet de physique expérimentale. Seconde édition, revue et augmentée par M. Rouland. 4 vols. xxxii+635+567+576+622 pp., portrait, plates, 8vo. *Paris, 1787*  
Electricity is treated in the second half of vol. iv. The work of which this is a continuation, *Description & usage d'un cabinet de physique*, was published in 1775. (See No. 455.)  
—See also 434.



Naudin Pinx.

Coron. Sculp. 1787.

*A. J. Segaud de la Fond, ancien Professeur de Mathématiques, Démonstrateur de la Physique expérimentale en l'Université, de la Société Royale des Sciences de Montpellier, des Académies de Petersbourg, d'Angers, de Baviere, de Valladolid, de Florence &c. &c. &c.*

543bis. SEGAUD DE LA FOND. *Portrait of author.*

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544. **Wakeley**, Andrew. (— — .) The mariner's compass rectified with a description of the most useful instruments in practice in the art of navigation, also a table of latitude and longitude of places, enlarged by J. Atkinson, the whole revised by John Adams. 272 pp. 8vo. London, for Mount and Page. *London, 1787*  
 Detailed use of the compass in navigation; a handbook for seamen.

544a.——Another edition, with additions by J. Atkinson, the whole revised by John Adams. 279 pp. 12mo. London, for Mount and Davidson. *London, 1796*

545. **Drury**, O'Brien. (— — .) Observations on the magnetic fluid. (Trans. Roy. Irish Acad., 1788, pp. 119-120.) 4to. *Dublin, 1788*  
 The author of the paper recommends covering compass-needles with a casing of thin, soft iron, the better to preserve their magnetism.

546. **Lo-Looz**, Robert de. (1730-1786.) Recherches sur les influences solaires et lunaires pour prouver le magnétisme universel. 4 parts. 7 plates. 8vo. Londres et Paris, Couturier. *Paris, 1788*  
 Work on cosmical magnetism in which the speculative element predominates.

547. **Prévost**, Pierre. (1751-1839.) De l'origine des forces magnétiques. xxiii+231 pp. 2 plates. 12mo. Genève, chez Barde. *Geneva, 1788*  
 Magnetism due to two fluids, which are self-repellent but mutually attractive. Terrestrial magnetism and the great central magnet, p. 200. The author of this work is the Swiss physicist to whom we are indebted for the "theory of exchanges" in heat, which bears his name.  
 —See also 2444.

548. **Ribright**, Thomas. (— — — .) Curious collection of experiments, to be performed on the electrical machines. Second edition enlarged and improved. 24 pp. 2 plates. 8vo. London, Steel. *London, 1788*

549. **Ussher**, H(enry). (1743-1790.) An account of an Aurora Borealis seen in full sunshine. (Trans. Roy. Irish Acad. vol. ii, pp. 189-191). 4to. *Dublin, 1788*  
 Note on the connection between terrestrial magnetism and the aurora borealis.

550.——An account of some observations made with a view to ascertain whether magnifying power or aperture contributes most to the discerning small stars in the day. (Trans. Roy. Irish Acad. vol. i, pp. 37-42.) 4to. *Dublin, 1788*

551. **Troostwijk**, Adrian Paets van (1752-1837), and C(ornelius) R(udolph) T(heodor) **Van Krayenhoff**. (1758-1840.) De l'application de l'électricité à la physique et à la medicine. (Translated by Jan Hendrik van Swinden.) xii+319 pp. 4 plates. 4to. Amsterdam, chez D. F. Changuin. *Amsterdam, 1788*  
 This work written in 1786, is an inquiry into the nature of lightning, St.

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Elmo's fire, rain and fogs. The influence of electricity on vegetation is considered; also theory and application of electricity as used for medical purposes. Van Troostwijk was, according to Ostwald, the first to decompose with certainty a chemical compound electrically, in 1789.

552. **Bennet, A(braham).** (1750-1799.) New experiments on electricity, wherein the causes of thunder and lightning as well as the constant state of positive and negative electricity in the air or clouds are explained, with experiments on the clouds of powders and vapours artificially diffused in the air, also a description of a doubler of electricity, and of the most sensible electrometer yet constructed, with other new experiments and discoveries in the science, illustrated by explanatory plates. 141 pp. 4 plates. 8vo. Derby, J. Drewry. *Derby, 1789*  
Bennet's *electroscope*, p. 18; his *doubler*, p. 76; electricity of powders, p. 22; flames used for determining the electric condition of the atmosphere, pp. 77, 103; the aurora borealis stated to be an electrical phenomenon, p. 104.  
—See also 2483.

553. **Brook, A(braham).** (fl. 1789.) Miscellaneous experiments and remarks on electricity, the air-pump and the barometer; with the description of an electrometer of a new construction. xiii+211 pp. 2 plates. 4to. Norwich, for J. Johnson. *Norwich, 1789*  
Description of the author's electrometer for quantitative measurements; the fracture and repair of Leyden jars; paper and tinfoil used for coatings, p. 96; experiments made during an aurora borealis, p. 110.  
—See also 2480.

554.† **Calandrelli, Giuseppe.** (1749-1827.) Ragionamento sopra il conduttore elettrico quirinale. xxxvi pp. 12mo. Bologna. *Bologna, 1789*  
Construction and function of lightning conductors with numerous references: views of Franklin, Beccaria, Lord Mahon; Franklin's Lightning Kite experiment, June, 1752; that of de Romas, July, 1753.

555. **(Darwin, Erasmus).** (1731-1802.) The botanic garden, a poem in two parts; Part i. The economy of vegetation. Part ii. The loves of the plants. Third edition. 2 vols. 4to. London. *London, 1789-1795*  
This is the principal work of Darwin, poet and physiologist; it contains numerous footnotes having reference to electrical phenomena.  
—See also 621, 2456.

556. **Deiman, J(ohann) R(udolph).** (1743-1808.) Beschryvving van eene electrizeer-machine. viii+93 pp. 2 plates. 4to. Amsterdam, W. Holtrop. *Amsterdam, 1789*  
Description of an electrical machine, with several pairs of plates.

557. **McCulloch, K(enneth).** (— — —.) An account of the new improved sea compasses made by K. McCulloch. With reports of their practical utility founded on some years experience by (Captain) Philip d'Auvergne and other scientific gentlemen. 30 pp. 3 plates. 8vo. London, Carpenter. *London, 1789*  
Remarks on the steering and azimuth compasses.

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558. **Meredith**, Nicholas. (— — .) Considerations on the utility of conductors for lightning in which the nature and properties of the lightning are explained. viii+45 pp. 1 plate. 8vo. London, for the author. *London, 1789*  
Usefulness of lightning conductors; action of points; fireballs, p. 14.

559. **Pascual**, Antonio Raymundo. (1708-1791.) Descubrimiento de la aguja nautica, de la situacion de la America, del arte de navegar, y de un nuevo metodo para el adelantamiento en las artes y ciencias. 320 pp. Sm. 4to. Madrid, Manuel Gonzales. *Madrid, 1789*  
The author argues at length that Raymond Lully in 1272 discovered the *directive* power of the magnet and its use in navigation; also that Lully's reasons for believing in the existence of a Western continent were known to Columbus.

560. **Marum**, Martin van. (1750-1837.) Description des frottoirs électriques d'une nouvelle construction, dont l'effet surpassé de beaucoup celui des frottoirs ordinaires. (Lettre à M. le Chev. Marsilio Landriani). 8 pp. 4to. Haarlem. *Harlem, 1789*  
A new form of rubber for frictional machines.

561.——Nader bericht van Dr. van Marum, wegens zyne nieuwe elektrische wryvers. (Algemene Konst-en Letter-Bode. Part ii., pp. 155-156.) 4to. *Harlem, 1789*  
Letter in which the author's frictional machine is described.  
—See also 461.

562. **Churchman**, John. (1753-1805.) Explanation of the magnetic atlas, or, variation chart, hereunto annexed, projected on a plan entirely new by which the magnetic variation on any part of the globe may be precisely determined for any time past, present, or future and the variation and latitude being accurately known, the longitude is of consequence truly determined. 46+5 pp. 2 tables. 8vo. Philadelphia, James & Johnson. *Philadelphia, 1790*  
Causes of magnetic variation, p. 33. The tables give the position of the earth's magnetic poles for a period of 400 years. The appendix contains letters from Thomas Jefferson, and Sir Joseph Banks.  
—See also 588.

563. **Fromery**, Nic(olaus) Corn(elis) de. (1770-1844.) De fulmine. 100 pp. 1 plate. 4to. Lugduni Batavorum, S. & J. Luchtmans. (Inaugural dissertation.) *Leyden, 1790*  
Origin of atmospheric electricity: lightning, thunder, protection of houses; Franklin's electrical work appraised.

564†. **Guetle**, Johann Conrad. (1747- ? .) Beschreibung verschiedener Elektrisirmaschinen zum Gebrauch fuer Schulen. xxxiv +312 pp. 11 plates. 12mo. Leipzig & Nuernberg, Schneider. *Leipzig & Nuremberg, 1790*  
Short history of electricity with copious references and a *bibliography*.

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The whole work consists of three parts: Parts i. & ii. also known under the title: *Beschreibung eines mathematischen und physikalischen Instrumenten-Kabinets*; and part iii., *Beschreibung elektrischer Instrumente*.

565. **Priestley**, Joseph. (1733-1804.) *Experiments and observations on different kinds of air, and other branches of natural philosophy, connected with the subject.* In three volumes, being the former six volumes abridged and methodized. With many additions. 3 vols. 9 plates. Birmingham, Thomas Pearson.

*Birmingham, 1790*

The discoveries described in this work established Priestley's reputation as a chemist and philosopher of eminence. The first edition, in three vols., appeared in 1774.

565a.——(French translation.) *Expériences et observations sur différentes espèces d'air. Ouvrage traduit de l'anglois par (Jacques) Gibelin.* 3 vols. 9 plates. 12mo. Paris, Nyon.

*Paris, 1782-1783*

—See also 422.

566. **Segnitz**, Friedrich Ludwig. (— — .) *De electricitate animali quam dicere solent magnetismum animalem.* 34 pp. 4to. Jenae, typis Goepfertii. (Inaugural dissertation.) *Jena, 1790* Dissertation on the curative power of electricity, followed by biographical notes of the author.

567. **Summary view** of the general principles of electricity. lxxvi pp. 1 plate. 8vo. (1790?)

The supplement contains an extract from de Saussure's observations on atmospheric electricity; also description of the famous Harlem frictional machine, and experiments on the electric light in vacuo by William Morgan.

568. **Boeckmann**, Johann Lorenz. (1741-1802.) *Ueber die Blitzableiter. Eine Abhandlung auf hoechsten Befehl des Fuersten ausgearbeitet.* 80 pp. 12mo. Carlsruhe, M. Macklot.

*Carlsruhe, (1791)*

Construction of lightning-rods: historical notes.

569.† **Condorcet**, Marie Jean Antoine Nicolas Caritat, Marquis de. (1734-1794.) *Éloge de M. Franklin, lu à la séance publique de l'Académie des Sciences, le 13 Nov. 1790.* 42 pp. 12mo. Paris, Pyre. (1791)

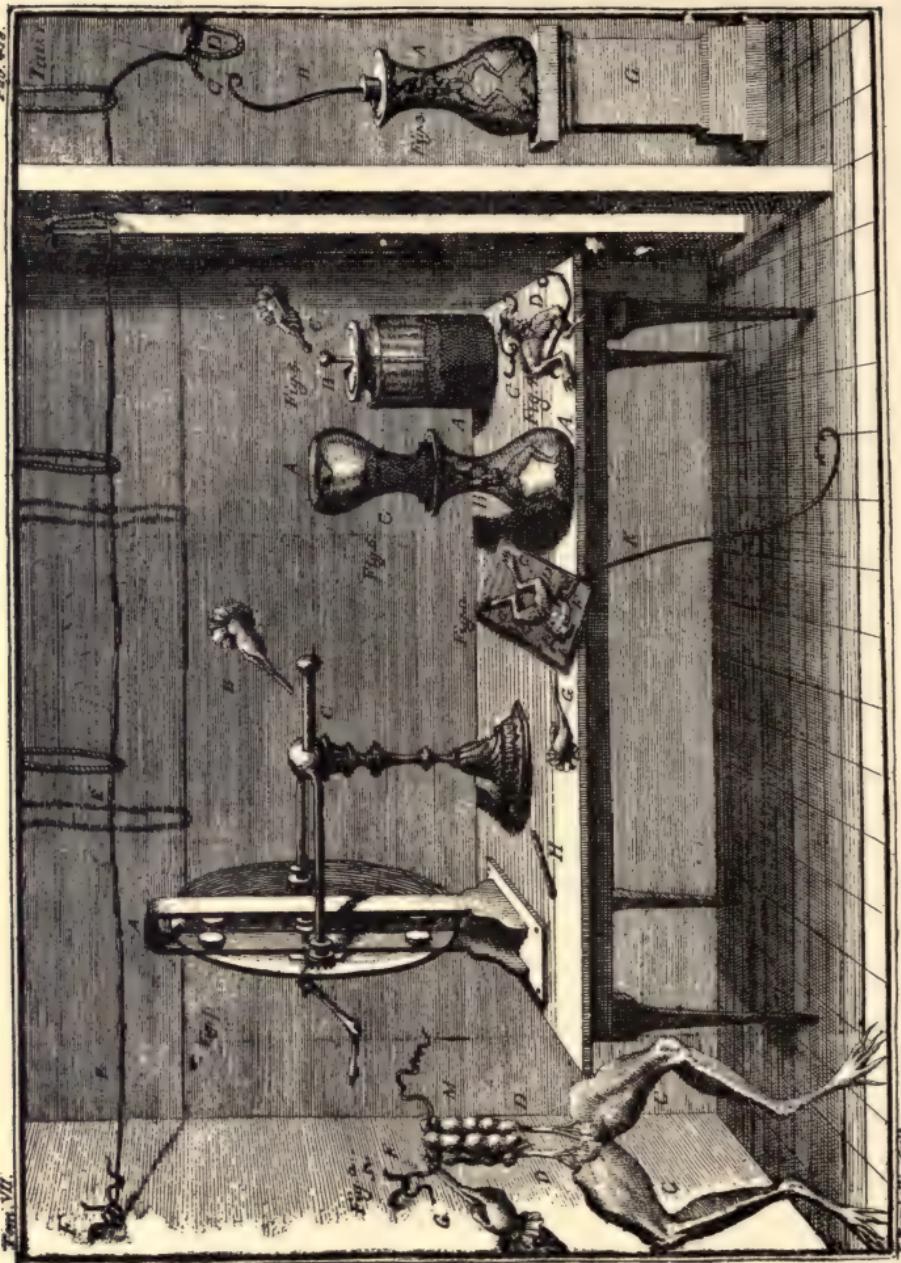
Appreciation of the character and work of Franklin by the celebrated French philosopher.

570. **Galvani**, Luigi. (1737-1798.) *De viribus electricitatis in motu musculari, Commentarius.* 58 pp. 4 plates. 4to. Bononiae, ex typographia Instituti Scientiarum. (1791)

First and very rare publication of Galvani on the electrical irritation of the nerves which led to the famous controversy between Galvani and Volta.

570a.——Another edition. *Cum Aldini dissertatione et notis. Accesserunt epistolae ad animalis electricitatis theoriā pertinentes.* xxv+80 pp. 3 plates. 4to. Mutinae, apud Societatem typographicam. (1792)

Galvani's paper is preceded by Aldini's celebrated dissertation on animal electricity. (See Nos. 575, 577, 578.)



### 570. *GALVANI*. (*Reduced.*)

# ALOYSII GALVANI

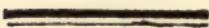
*In Bononiensi Archigymnasio, & Instituto Scientiarum  
Publici Professoris, Anatomici Emeriti,  
Academicici Benedictini*

## DE VIRIBUS ELECTRICITATIS IN MOTU MUSCULARI COMMENTARIUS

*C U M*

JOANNIS ALDINI  
DISSERTATIONE ET NOTIS.

Accesserunt Epistolæ ad animalis electricitatis  
theoriam pertinentes.



MUTINÆ MDCCXCII.

APUD SOCIETATEM TYPOGRAPHICAM.  
*Superiorum permisso.*

575. ALDINI. (Reduced.)

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570b.— —(German translation.) *Abhandlung ueber die Kraefte der thierischen Elektricitat auf die Bewegung der Muskeln nebst einigen Schriften von H. H. Valli, Carminati und Volta ueber eben diesen Gegenstand. Uebersetzt und herausgegeben von D. Johann Mayer.* xxviii+183 pp. 4 plates. 12mo. *Prag, J. G. Calve.* *Prague, 1793*

—See also 575, 606, 999, 1798.

571. **Lyon**, John. (1734-1817.) *Remarks on the leading proofs offered in favour of the Franklinian system of electricity, with experiments to shew the direction of the electric effluvia, visibly passing from what has been termed negatively electrified bodies.* 47 pp. 3 plates. 8vo. *London, J. Phillips.*

*London, 1791*

The author controverts the Franklinian theory of the Leyden jar and holds that glass is permeable to electric effluvia; electricity of the atmosphere; negative electrification regarded as the more important; positive and negative brushes distinguished.

—See also 493.

572. **Marum**, Martin van. (1750-1837.) *La description d'une machine électrique, construite d'une manière nouvelle et simple, et qui réunit plusieurs avantages sur la construction ordinaire. (Lettre à M. Jean Ingenhousz).* 4 pp. 2 plates. 4to.

*(Harlem), 1791*

Illustrated description of the Harlem electrical machine.

573.— —Lettre à M. Berthollet contenant la description d'un gazomètre, construit d'une manière différente de celui de Lavoisier & Meusnier et d'un appareil pour faire très exactement l'expérience de la composition de l'eau, par combustion continue, avec plus de facilité et moins de frais. 4 pp. 2 plates. 4to.

*Harlem, 1791*

Apparatus for the decomposition of water by means of heat.

—See also 461.

574. **Aberg**, Ulrich Johann. (— — .) *Comparatio inter vim magneticam, et electricam.* 20 pp. 4to. *Lundae, (Inaugural dissertation.)* *Lund, 1792*

Electric and magnetic "matter;" effect of polar aurorae on the compass-needle.

575. **Aldini**, G(iovanni). (1762-1834.) *De animalis electricae theoriae ortu atque incrementis.* xxvi pp. 4to. (Dissertatio.) *Mutinae, apud Societatem typographicam.* *Modena, 1792*

Original work on animal electricity; Aldini upheld the views of Galvani, his uncle, on animal magnetism.

—See also 570a, 644, 660, 754.

576. **Birch**, John. (1745-1815.) *Letter to Mr. George Adams on the subject of medical electricity.* 57 pp. 8vo. *London.*

*London, 1792*

Account of experiments in medical electricity extending over twelve years;

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details of numerous cures. "I shall hope that an electrical machine may hereafter be considered an *instrument of surgery*," p. 57.  
—See also 488.

577.† **Brugnatelli**, Luigi Valentino. (1761-1818.) *Memorie sull' elettricità animale inserite nel Giornale Fisico-medico del Sig. Brugnatelli.* 147 pp. 8vo. Pavia, B. Comini. *Pavia, 1792*  
This volume contains a letter from Galvani on animal electricity and three memoirs by Volta on the same subject, all of which were published by Brugnatelli in his *Giornale "Fisico-Medico."* (See No. 570a.)

578. **Carminati**, Bassiano. (1750-1830.) *Lettera al Signor Luigi Galvani. (Sull' elettricità animale.)* (Aldini, "De viribus electricitatis in motu musculari," pp. 67-70). 4to. Mutinae, Comes. *Modena, 1792*  
Carminati's letter is followed by an answer from Galvani. (See No. 575.)

579. **Robertson**, William. (1721-1793.) *Historical disquisition concerning the knowledge which the Ancients had of India; and the progress of trade with that country prior to the discovery of the passage to it by the Cape of Good Hope. With an appendix containing observations on the civil policy, the laws and judicial proceedings, the arts, the sciences and religious institutions of the Indians.* viii+366 pp. 2 maps. 12mo. Basil, Tourneisen. *Basle, 1792*  
The Scotch historian gives on p. 228 reasons for believing that the compass was unknown to the Arabs and Chinese.

580. **Young**, A(rthur). (1741-1820.) *Travels during the years 1787, 1788, and 1789, undertaken more particularly with a view of ascertaining the cultivation, wealth, resources, and national prosperity of the Kingdom of France.* v+566 pp. maps. 4to. Bury St. Edmunds. J. Rackham. *Bury St. Edmunds, 1792*  
Words transmitted *electrically* by means of *pith-balls*, p. 188.

580a.——(French translation.) *Voyages en France, pendant les années 1787, 1788, 1789 et 1790. Entrepris plus particulièrement pour s'assurer de l'état de l'agriculture, des richesses, des ressources et de la prospérité de cette nation.* Traduit de l'Anglais par F. S(oulès) avec des notes et observations par M. Decasaux, et des cartes géographiques de la navigation et du climat. 3 vols. maps. 8vo. Paris, Buisson. l'an ii. *Paris, 1793*

580b.——Nouvelle traduction par Mr. Lesage, précédée d'une introduction par M. Léonnée de Lavergne. 2 vols. 1 map. 12mo. Paris, Guillaumin. *Paris, 1860*

581. **Bohnenberger**, G(ottlieb) C(hristian). (1732-1807.) *Beytraege zur theoretischen und praktischen Elektrizitaetslehre.* 2 parts. 2 plates. 8vo. Stuttgart. Metzler. *Stuttgart, 1793*  
Part i. treats of the electric charges of clouds during thunderstorms, p. 73; Wilson's electrical machine, p. 96; Part ii. consists of remarks on Priestley's "History of Electricity. (See No. 453). The complete work comprises 5 parts, 1793-1795.

—See also 534.

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582. Dalton, John. (1766-1844.) Meteorological observations and essays. xvi+208 pp. 8vo. London, for W. Richardson.  
*London, 1793*  
 Nature and cause of the aurora borealis by the celebrated author of the atomic theory of matter followed by a list of essays published by him.

582a.——Second edition. With appendix. xx+244 pp. 8vo. Manchester, Baldwin.  
*Manchester, 1884*  
 —See also 2626.

583. Fowler, Richard. (1765-1863.) Experiments and observations relative to the influence lately discovered by M. Galvani and commonly called animal electricity. iii+176 pp. 8vo. Edinburgh, for T. Duncan.  
*Edinburgh, 1793*  
 Professor Cotugno of Naples, in 1784 received a shock while dissecting a mouse, p. 2; Sulzer in 1767 experienced a peculiar taste when plates of lead and silver were placed above and below the tongue and connected at the outer end, p. 169; Professor Robison of Edinburgh made a *rouleau* of zinc plates and shilling pieces, p. 172, in the year 1793, seven years before the invention of the voltaic pile.  
 "I had a number of pieces of zinc made the size of a shilling and made them up into a rouleau with as many shillings. I find this alternation in some circumstances increases considerably the irritation. If the side of the rouleau be applied to the tongue so that all the pieces are touched by it, the irritation is very strong and disagreeable." p. 173.

584. Peart, Edward. (1756-1824.) On electric atmospheres, in which the absurdity of the doctrine of positive and negative electricity is proved, and the real nature, production, mode of existence and properties of atmospheres in an electric state, are clearly demonstrated and explained; to which is prefixed a letter addressed to Mr. Read of Knightsbridge, in reply to his Remarks on the author's former tract on electricity. xlii+81 pp. 8vo. Gainsborough, for W. Miller.  
*Gainsborough, 1793*  
 Belabored refutation of the doctrine of one homogenous, electric fluid.

585. Read, John. (— — .) A summary view of the spontaneous electricity of the earth and atmosphere, wherein the cause of lightning and thunder, as well as the constant electrification of the clouds and vapours, suspended in the air, are explained. To which is subjoined the atmospherico-electrical journal, kept during two years as presented to and published by the Royal Society of London. viii+160 pp. 1 plate. 8vo. London, for the author.  
*London, 1793*  
 Double *burr* produced by the spark discharge, p. 44; Canton's *silk rubber* coated with amalgam of mercury and tin, p. 89; journal relating to atmospheric electricity, p. 109. (See No. 584.)  
 —See also 2494.

586. Valli, Eusebio. (1755-1816.) Experiments on animal electricity with their application to physiology, and some pathological and medical observations. xvi+323 pp. 8vo. London, for J. Johnson.  
*London, 1793*  
 Animal electricity and the nervous fluid are assumed to be one and the same.

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587. **Marum**, (Martin) van. (1750-1837.) Beandwoording der aanmerkingen von B. Tersier, betreffende het gebruik, van zuivere lucht en't warme bad, ter redding van Drenkelingen. 64 pp. 8vo. Haarlem, A. Loosjes. *Harlem, 1793*  
Synthesis of water, p. 26.  
—See also 461.

588. **Churchman**, John. (1753-1805.) The magnetic atlas, or variation charts of the whole terraqueous globe, comprising a system of the variation and dip of the needle, by which the observations being truly made the longitude may be ascertained. 80 pp. 3 plates. 4to. London, for the author. *London, 1794*  
The introduction to the atlas contains a brief history of magnetic discovery. Aurora borealis, xxvii., aurora australis, xxviii.; age of the American continent, p. 58; magnetic charts.

588a.—Fourth edition. xviii.+86 pp. 3 maps. 4to. *London, 1804*  
—See also 562.

589. **Morgan**, G(eorge) C(adogan). (1754-1798.) Lectures on electricity. 2 vols. 2 plates. 12mo. Norwich, J. March. *Norwich, 1794*  
Striking distance and conducting terminals, vol. ii., p. 61; resistance of vacuum tubes, p. 171; origin of natural electricity, p. 303; effect of electricity on vegetation, p. 383; on animals, p. 394; construction of electrical apparatus, p. 439.

590. **Priestley**, Joseph. (1733-1804.) Heads of lectures on a course of experimental philosophy, particularly including chemistry, delivered at the New College in Hackney. xxviii+180 pp. 8vo. London, for Johnson. *London, 1794*  
Notes on electricity and magnetism.  
—See also 422.

591. **Reimarus**, J(ohann) A(lbert) H(einrich). (1729-1814.) Ausfuehrliche Vorschriften zur Blitz-Ableitung an allerley Gebaeuden. 46 pp. 2 plates. 8vo. Hamburg. C. E. Bohn. *Hamburg, 1794*  
Lightning-conductors for dwelling-houses, public buildings, and ships.  
—See also 474.

592. **Walker**, Ralph. (— .) Treatise on magnetism; with a description and explanation of a meridional and azimuth compass for ascertaining the quantity of variation, without any calculation whatever, at any time of the day; also improvements upon compasses in general with tables of variation for all latitudes and longitudes. 226 pp. 7 plates. 8vo. London, Hindmarsh. *London, 1794*  
Written for the use of the practical man. Magnetism is considered a fluid which pervades the globe, the atmosphere and the universe, p. 9; bundle of needles magnetized by a flash of lightning, p. 10; tables of declination and dip at various places and times.

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593. **Canali**, Luigi. (1759-1841.) Questions sur la loi découverte par Mr. Le Chevalier Volta relativement à l'électricité des vapeurs. (Mém. Acad. Sc. Turin, vol. vi., part 2, pp. 61-114). 4to. *Turin, 1795*  
The electricity of vapors, and associated atmospheric phenomena; Father Beccaria is frequently quoted.

594. **Lorimer**, John. (1732-1795.) Concise essay on magnetism with an account of the declination of the magnetic needle and an attempt to ascertain the cause of the variation thereof. xv+34+7 pp. 6 plates. portr. 4to. London, for the author. *London, 1795*  
Guyot de Provins and his poem on the magnet, 12th century; Peregrinus, A. D. 1269; also the Belgian plagiarist, Taisnier; Columbus and magnetic declination. (See No. 502.)

594a.— —Second edition. 53 pp. 4 plates. 8vo. London, Jones. *London, 1800*  
—See also 2467.

595. **Young**, (Sir) William. (1st Bart.) (1749-1815.) Account of the Black Charaibs in the island of St. Vincent's; with the Charaib treaty of 1779 (or rather 1773), and other original documents. Compiled from the papers of the late Sir W. Y. (by Sir William Young, 2nd Bart.) 125 pp. 8vo. London, for Sewell. *London, 1795*

596. **Entertaining extracts**, being a select collection from new books of merit. iv+248 pp. pls. Sm. 4to. Perth, for R. Morison. *Perth, 1795*  
Description of an optical and also of a mechanical telegraph, p. 30.

597. **Akenside**, Mark. (1721-1770.) The pleasures of the imagination, (poem in three books), to which is prefixed A critical essay on the poem by Mrs. (Anne Letitia) Barbauld. 36+159 pp. 4 plates. 12mo. London, for T. Cadell. *London, 1796*  
This didactic poem contains a lengthy reference to sympathetic compasses. (See No. 3857.)

598. **Gregory**, George. (1754-1808.) The economy of nature explained and illustrated on the principles of modern philosophy. 3 vols. 46 plates. 8vo. London, for J. Johnson. *London, 1796*  
General phenomena of electricity popularly treated, vol. i.; animal electricity, vol. iii.  
—See also 767.

599. (Harrington, Robert.) (— — —.) A new system on fire and planetary life; shewing that the sun and planets are inhabited, and that they enjoy the same temperament as our earth. Also an Elucidation of the phenomena of electricity and magnetism. iv+75 pp. 8 vo. London, Cadell. *London, 1796*  
Remarks on electrical attraction and repulsion.

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Polarity due to orientation, p. 11; broken magnet, p. 11; magnetic screening, p. 12.

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Rules for finding the variation of the compass. The first edition appeared in 1779.

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—See also 422.

603. **Volta, Alessandro.** (1745-1827.) Schreiben an den Herrn Abt Anton Maria Vasali ueber die thierische Elektrizitaet als eine Fortsetzung der Schriften desselben ueber die thierische Elektrizitaet, herausgegeben von Dr. Johann Mayer. 77 pp. 12mo. Prag, Calve. *Prague, 1796*  
The author denies Galvani's conclusions and affirms his own contact theory.  
—See also 428.

604. **Watkins, J. (— —) and W. Watkins.** (— —.) A short account of the azimuthal or invariable compass, wherein are mentioned how it was discovered; the private trials of it; its utility in navigation and surveying; with the best methods of proving its true and permanent polarity at sea and on land. 16 pp. 1 plate. 8vo. London, for J. and W. Watkins. *London, 1796*  
It is here claimed that the compass-needle "indicates invariably and truly the four cardinal points of the horizon."

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The *telograph* was a mechanical device for the transmission of signals, see p. 5.

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Papers on electricity in which Galvani criticizes Volta's views, p. 1; states his own, p. 31; explains the function of the metallic arc-connection, p. 49.  
—See also 570.

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—See also 327.

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—See also 490.

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*London, 1798*

The author assumes that electricity is a fluid which is subject to the same laws as ordinary matter. His theory of the Leyden jar, applying purely mechanical principles, p. 34.

—See also 619, 667.

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Methods of electrifying bodies, p. 65; electric amalgams, p. 67; a new "electrometer," p. 124. —

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After describing Cotugno's electro-physiological experiment, p. 26, the author discusses various galvanic phenomena and refutes Volta's theory, holding that the galvanic and the electric fluid are not identical.

—See also 663, 677, 1159.

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—See also 1192, 2522.

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—See also 613.

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—See also 555.

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—See also 406.

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—See also 673.

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—See also 702.

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—See also 651.

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—See also 366.

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—See also 705.

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—See also 250.

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—See also 575.

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 Magnetic observations made in America and in Europe. Biot's well-known hypothesis of a short central magnet to account for the phenomena of terrestrial magnetism, p. 14. (With Humboldt's autograph.)  
 —See also 616, 633.

664. Izarn, Joseph. (1766-1834.) Manuel du galvanisme, ou Description et usage des divers appareils galvaniques employés jusqu'à ce jour, tant pour les recherches physiques et chimiques que pour les applications médicales. xxii+304 pp. 6 plates. 12mo.  
*Paris, 1804*  
 Sulzer's experiment made in 1767 with strips of lead and silver placed above and below the tongue, p. 3; Cotugno of Naples dissected a mouse in 1784 and felt a benumbing sensation in his hands, p. 4; Romagnosi, a physician of Trent, in 1802 deflected an insulated compass-needle by bringing it near an insulated wire connected with one pole of a voltaic pile, p. 120; Mojon magnetized steel needles in 1804. (See Nos. 974, 2548.)

664\*a.—Another edition. xxii+304 pp. 6 plates. 8vo.  
*Paris, 1805*

665. Pfaff, (Johann) Wilhelm (Andreas). (1774-1835.) Uebersicht ueber den Voltaismus und die wichtigsten Saetze zu Begründung einer Theorie desselben. 127 pp. 12mo.  
*Stuttgart, 1804*  
 Laws and theory of the voltaic cell.  
 —See also 836.

666. Webster, John. (—.) Elements of natural philosophy explaining the laws and principles of attraction, gravitation, mechanics, pneumatics, hydrostatics, hydraulics, electricity and optics; with a general view of the solar system. xii+302 pp. ill. 8vo.  
*London, 1804*  
 The volume contains a popular treatment of frictional electricity. A new edition with additions appeared in 1807.

667. Wilkinson, C(harles) H(enry). (fl. 1800.) Elements of galvanism in theory and practice; with a comprehensive view of its history from the first experiments of Galvani to the present time, containing also practical directions for constructing the Galvanic apparatus, and plain systematic instructions for performing all the various experiments. 2 vols. 13 plates. 8vo.  
*London, 1804*  
 Volume i. is chiefly historical; vol. ii. treats of the method of producing the electric current and of its application to medical cases.  
 —See also 613.

CATALOGUE OF WHEELER GIFT

668.† **Rapport** fait à la classe des sciences mathématiques et physiques de l'Institut National, sur les expériences du citoyen Volta. (par (Jean Baptiste) Biot; (Pierre) de la Place, (Charles) Coulomb, (Jean) Halle, (Gaspard) Monge, (Antoine) Fourcroy, (Louis) Vauquelin, (Pierre) Pelletan, (Jacques) Charles, (Mathurin) Brisson, (Raphael) Sabathier, et (Louis) Guyton.) (Reprinted from *Mém. Inst. Paris*, vol. v.) 29 pp. 4to. *Paris, 1804*  
Views of the committee appointed by the Académie des Sciences to report on Volta's contact-force and the theory of the voltaic pile.

669. **Azuni**, Dominique Albert. (1749-1827.) *Dissertation sur l'origine de la boussole.* xvi+133 pp. 8vo. *Paris, 1805*  
Extended discussion of the claims which have been advanced at various times to the invention of the mariner's compass. A new edition with additions appeared in 1809.

670. **Barrow**, (Sir) John. (1764-1848.) *Voyage en Chine en 1794* formant le complément du voyage de Lord Macartney. Traduit de l'Anglais avec des notes par J. Castéra. vol. i. (complete in 3 vols. and 1 vol. Atlas.) 8vo. *Paris, 1805*  
Use of the lodestone in remote antiquity for directive purposes, p. 60.  
—See also 729.

671. **Pacchiani**, Francesco Giuseppe. (1771-1835.) *Lettera al Lorenzo Pignotti.* 8 pp. 12mo. *Pisa, 1805*  
Note of some chemical interest.

672. **Popham**, (Sir) Home (Briggs). (1762-1820.) *Telegraphic signals; or, Marine vocabulary.* 113 pp. pl. 8vo. *London, 1805*  
Special system of flag-signaling proposed.

673. **Ritter**, J(ohann) W(ilhelm). (1776-1810.) *Das elektrische System der Koerper.* 412 pp. 21 tables. 8vo. *Leipzig, 1805*  
Electrification is held to be due to contact; theory of the voltaic battery.  
—See also 623.

674. **Bryan**, Margaret. (fl. 1815.) *Lectures on natural philosophy;* the result of many years' practical experience of the facts elucidated, with an appendix containing a great number and variety of astronomical and geographical problems; also some useful tables, and a comprehensive vocabulary. 388 pp. 35 plates. 4to. *London, 1806*  
The volume contains three class-lectures on magnetism and electricity. The authoress, whose portrait is given, was a beautiful and accomplished woman.

675. **Franklin**, Benjamin. (1706-1790.) *Complete works in philosophy, politics and morals of the late Dr. Benjamin Franklin,* now first collected and arranged, with *Memoirs of his early life* written by himself. 3 vols. portr. map. pl. 8vo. *London, 1806*

"The appendix to vol. i. contains communications on important electrical matters. The editor was a Mr. Marshall. His name is not connected with

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the works; but he performed his part with good judgment, and used much diligence in searching for essays and papers, that had not before been comprised in any collection. Mr. Benjamin Vaughan who was then in London, rendered him important assistance."—Sparks.

675a.—Complete works in philosophy, politics and morals; containing besides all the Writings published in former Collections, his diplomatic correspondence, as minister of the United States, at the Court of Versailles; a variety of literary and epistolary correspondence never before published with memoirs and anecdotes of his life. 6 vols. portr. 8vo.

*Philadelphia, 1809-1818*

Franklin's electrical work will be found in vol. iii.: "This edition was begun in 1808, but owing to the delay of Temple Franklin (with whom Duane agreed to an exchange of material), in printing his edition, it was not completed till 1818. The editor added many pieces to what had hitherto been printed as Franklin's, derived almost wholly from the books and MSS. which came into his possession by his marriage with the widow of Franklin Bache, but the work is so full of blunders and misstatements that its chief value has been to other editors of Franklin. Vol. vi. has on the title-page, 'Published from the originals by his Grandson William Temple Franklin.'"

—Ford. P. L., Franklin Bibliography.

—See also 367.

676. **Hudson, Thomas.** (— — — .) Electricity. (The Accomplished Tutor, vol. ii., pp. 285-315.) 3 plates. 8vo. *London, 1806*  
The elements of static electricity.

677. **Humboldt, (Friedrich Heinrich) Alexander von.** (1769-1859.)  
Versuche ueber die electrischen Fische. 30 pp. 12mo.  
*Erfurt, 1806*

Study of the electric organs of the *gymnotus* and the *torpedo*.

—See also 616.

678. **Magalotti, Lorenzo.** (1637-1712.) Saggi di naturali esperienze fatte nell' Accademia del Cimento. 282 pp. 5 plates. 8vo.  
*Milan, 1806*

Experiments on air-pressure, humidity, effects of heat and cold.

—See also 253.

679. **Steinhaeuser, Johannes Gottfried.** (1768-1825.) De magnetismo telluris; Sect. i. Magnetis virtutes in genere proponens. 52 pp. 1 plate. 4to.  
*Wittenberg, 1806*

The law of distance; extensive use is made of the method of oscillations.

679a.—Sect. ii. De inclinatione acus magneticae cuius innotescunt et locus et efficiendi facultas. 50 pp. 4to. *Wittenberg, 1810*  
Mathematical treatment of magnetic dip.

680. **Bidone, Giorgio.** (1781-1839.) Description d'une nouvelle boussole propre à observer les mouvements de rotation et de translation de l'aiguille aimantée, et expériences faites avec cet instrument. Lecture du 28 Nov. 1807. 26 pp.+61. 3 plates. 4to.  
*Turin, 1807*

Description of a magnetometer devised by the author and used by him in a research on the law of the inverse square of the distance.

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681. **Cuthbertson, John.** (— — — .) Practical electricity, and galvanism containing a series of experiments, calculated for the use of those who are desirous of becoming acquainted with that branch of science. xx+271 pp. 9 plates. 8vo.  
*London, 1807*  
 Series of experiments in static electricity; magnetism developed by Leyden jar discharges, p. 233; electrical kite, p. 237.

681a.—Second edition. With corrections and additions. xxiii+294 pp. 9 plates. 8vo.  
*London, 1821*  
 —See also 507.

682. **Grigby, G(eorge).** (— — — .) Memoir containing a description of the construction and use of some instruments, to ascertain the heights and distances of inaccessible objects without the necessity of reference to logarithmic tables. 45 pp. 2 plates. 4to.  
*London, 1807*  
 Determination of certain problems in heights and distances by means of proportions derived from similar triangles.

683. **Hare, R(obert).** (1781-1858.) Animadversions on the review of his theory of galvanism by Dr. Patterson. Published in the first number of the Philadelphia Medical and Physical Journal. 18 pp. 8vo.  
*Philadelphia, (1807)*  
 Paper of a personal, controversial nature.  
 —See also 769, 895, 906, 2754.

684. **Hauey, R(ené) J(ust).** (1743-1822.) Elementary treatise on natural philosophy, translated from the French by Olinthus Gregory. 2 vols. 24 plates. 8vo.  
*London, 1807*  
 Vol. i. theory of Aepinus, p. 382; von Kleist, p. 394; function of lightning-rods, p. 421; tourmaline, p. 427; vol. ii. contains a discussion of terrestrial magnetism. Abbé Hauey was among the foremost *savants* of his day.  
 —See also 541.

685. **Lucretius Carus, Titus.** (99-55 B. C.) De rerum natura, libri sex, quibus interpretationem et notas addidit Thomas Creech. Editio nova. xvi+495 pp. 8vo.  
*Oxford, 1807*  
 Allusions to the magnet: iron filings in brass basin with movable lodestone underneath; magnetic attraction and repulsion; Samothracian rings, p. 387. This is the didactic work of the Latin poet, to which allusion is frequently made by writers on magnetism. First printed edition, 1500.

686. **Young, (Sir) Thomas.** (1773-1829.) Course of lectures on natural philosophy and the mechanical arts. 2 vols., map, 5 plates. 4to.  
*London, 1807*  
 This celebrated course of lectures was given at the Royal Institution, London, when the author was Professor of Natural Philosophy. It contains two lectures on electricity and one on magnetism with bibliography.

686a.—New edition with references and notes by P. Kelland. 2 vols. 8vo.  
*London, 1845*  
 —See also 643.

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687. **Gerboin, A(ntoine) Cl(aude).** (1758-1827.) Recherches expérimentales sur un nouveau mode de l'action électrique. 358 pp. 1 plate. 8vo. *Strasburg, 1808*  
 Experiments made with a heavy body suspended by a thread; the author holds that the swing of the pendulum is affected by neighboring substances according to their nature. A "dry" pile is referred to in a note on p. 270.

688.† **Limes, J. M.** (— — —.) L'électricité, sa cause, sa nature, sa théorie; le galvanisme, le magnétisme. viii+106+12 pp. 8vo. *Paris, 1808*  
 This is a feeble attempt to explain electrical phenomena by *latent caloric*.

689. **Macdonald, John.** (1759-1831.) Treatise on telegraphic communication, naval, military and political, in which the known defects of the present system of telegraphic practice by sea and land are obviated by the introduction of a numerical portable dictionary; with some considerations on the present state of the marine code and of naval signals. 186 pp. 5 plates. 8vo. *London, 1808*  
 Volume of directions for flag-signaling.  
 —See also 739, 757, 2495.

690. **Spratt, James.** (1771-1853.) Homograph; or Every man a signal tower. 32 pp. 4 plates. Sm. 4to. *London, (1808)*  
 A method is proposed for signaling by means of a white handkerchief; numerous illustrations.

691. **Trommsdorff, Johann B(artholomaeus).** (1770-1837.) Geschichte des Galvanismus; oder, der Galvanischen Elektricität, vorzüglich in chemischer Hinsicht. Second edition. 264 pp. 1 plate. 8vo. *Erfurt, 1808*  
 History of the early period of the electric current. The first edition of this work appeared in 1803.

692. **Venanson, Flaminius.** (— — —.) De l'invention de la boussole nautique. 172 pp. 8vo. *Naples, 1808*  
 The invention of the mariner's compass is attributed, after much discussion, to *Flavio Gioja* of Amalfi.

693. **Cancellieri, Francesco Girolamo.** (1751-1826.) Dissertatione epistolare bibliografica sopra Christoforo Colombo di Ceccaro nel Monferrato, discopritore dell' America, e Giovanni Gerson di Cavaglia abate di S. Stefano in Vercelli, autore del libro De imitatione Christi, al ch. sign. cavaliere Gioanfrancesco Galiani Napione di Cocconato Passano. 2 parts. xi+415 pp. port. 8vo. *Rome, 1809*  
 The discovery of magnetic declination by Columbus is discussed, p. 58. Part i. contains: Notizie storiche e bibliografiche di Christoforo Colombo. Part ii.: Notizie storiche e bibliografiche di Giovanni Gerson.

694. **Capper, James.** (1743-1825.) Meteorological and miscellaneous tracts, applicable to navigation, gardening and farming, with

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calendars of Flora for Greece, France, England and Sweden. xix+211 pp. tab. 8vo. *Cardiff, (1809?)*

Observations on the aurora borealis and the barometer with scattered remarks on atmospheric electricity.

695. **Delaunay**, Claude Veau (also Veau de Launay, Claude Jean). (1755-1826.) *Manuel de l'électricité, comprenant les principes élémentaires, l'exposition des systèmes, la description et l'usage des différens appareils électriques, un exposé des méthodes employées dans l'électricité médicale; avec treize planches; suivi d'une table chronologique de tous les ouvrages relatifs à l'électricité.* iv+80+22 pp. 13 plates. 8vo. *Paris, 1809*  
Careful exposition of static electricity preceded by historical sketch and followed by a *bibliography* of the subject.

696. **Franklin**, Benjamin. (1706-1790.) Works, consisting of his life, written by himself, together with essays, humorous, moral and literary. 2 vols. portr. 12mo. *Edinburgh, 1809*  
The autobiography is followed by Dr. Stuber's continuation of Franklin's life. The story of the *Lightning Kite* is given on p. 135.  
—See also 367.

697.\* **(Green and Hazard.)** An epitome of electricity and galvanism. By two Gentlemen of Philadelphia. iv pp.+21.+xlviii pp.+21.+159 pp.+41. pl. 8vo. *Philadelphia, 1809*  
This is one of the earliest works on electricity published in America; it contains a carefully written account of contemporary discoveries, experiments and investigations.

698. **Hager**, Joseph. (1757-1819.) *Memoria sulla bussola orientale.* 31 pp. ill. Folio. *Pavia, 1809*  
The author gives the Chinese credit for the invention of the mariner's compass and also for a knowledge of magnetic variation; the pamphlet contains numerous references.

699. **Nicholson**, William. (1755-1815.) British encyclopedia; or Dictionary of arts and sciences, illustrated by Messrs. Lowry and Scott. 5 vols. pls. 8vo. *London, 1809*  
There are short articles on electric and magnetic subjects; also a lengthy account of the life and works of Franklin.  
—See also 510.

700. **Wesley**, John. (1703-1791.) Survey of the wisdom of God in the creation; or, A compendium of natural philosophy. 5 vols. 12mo. *London, 1809*  
A handy encyclopaedia by the founder of Methodism; electricity and magnetism briefly treated. First edition, 1763.  
—See also 403.

701. **Bywater**, John. (— — —.) *Essay on the history, practice and theory of electricity.* iii+127 pp. 2 plates. 8vo. *London, 1810*  
The author holds that there are two electric fluids, *viz.*, caloric and the constituent parts of the atmosphere, p. 94.

AN  
EPITOME  
OF  
ELECTRICITY & GALVANISM.

BY TWO GENTLEMEN OF PHILADELPHIA.

Causa latet; vis est notissima.—Ovid's Met. B. . l. 287.

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697.\* GREEN AND HAZARD.

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702. **Cuvier**, (George Léopold Chrétien Frédéric Dagobert de). (1729-1822.) Rapport historique sur les progrès sciences naturelles depuis 1789, et sur leur état actuel présenté au gouvernement le 6 Feb. 1808. xvi+394 pp.+1. 8vo. *Paris, 1810*  
 Brief history of "galvanism" p. 57; Volta's pile, p. 60.  
 —See also 627.

703. **Delambre**, Jean Baptiste Joseph. (1749-1822.) Rapport historique sur les progrès des sciences mathématiques depuis 1789 et sur leur état actuel. vii+362 pp. 8vo. *Paris, 1810*  
 This historical report on the progress of mathematics was edited by Delambre, perpetual Secretary of the Academy of Sciences.  
 —See also 766.

704. **De Luc**, J(ean) A(ndré). (1727-1817.) On the electric column and aerial electroscope. (Nicholson's Philos. Journ. Ser. II., Vol. 27, pp. 81-114.) 8vo. *London, 1810*  
 Electrification due to contact; general effects.  
 —See also 661.

705. **Libes**, A(ntoine.) (1752-1832.) Histoire philosophique des progrès de la physique. Vols I., II. (cplte in 4 vols.) 8vo. *Paris, 1810*  
 The progress of each branch of physical science briefly recorded; work of considerable merit.  
 —See also 637.

706. **Mackay**, Andrew. (1760-1809.) Theory and practice of finding the longitude at sea or land, to which are added various methods of determining the latitude of a place and variation of the compass, with new tables. Third edition. 2 vols. 8 plates. 8vo. *London, 1810*  
 Chapter on the compass and methods of finding the variation.  
 (First edition published in 1793.)

707. **Yatman**, Matthew. Familiar analysis of the fluid capable of producing the phenomena of electricity and galvanism, or combustion; with some remarks on simple galvanic circles, and their influence upon the vital principle of animals. 73 pp. 8vo. *London, 1810*  
 Electrical influence is the vital principle by which all nature is animated and regulated. Instances are given of its curative powers.

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 Attempt at forming a universal language.

709. **Soemmering**, Samuel Thomas. (1755-1830.) Ueber einen elektrischen Telegraphen. (Denkschr. Baier. Akad. der Wiss. Muenchen, 1809-1810, pp. 401-414.) 2 plates. 4to. *Munich, 1811*  
 The author's telegraph in which signals are made by the decomposition of water; diagram of apparatus.



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J. S. Walwert sculps.

709. SOEMMERING. (Reduced.)

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710. **Davy**, (Sir) Humphry. (1778-1829.) Elements of chemical philosophy. Part I. (all published) 10 plates, portr. 8vo.  
*London, 1812*  
 Chapter on radiant matter.  
 —See also 634.

711. **De Luc**, J(ean André.) (1727-1817.) On the electrical effects produced by friction between bodies. (Extract, Nicholson's Philos. Journ., Vol. 33) 12 pp. 8vo.  
*London, 1812*  
 Electrical experiments with glass, ribbons, sealing-wax.  
 —See also 661.

712. **Kluge**, Karl Alexander Ferdinand. Proeve eener voorstelling van het dierlijk magnetismus als geneesmiddel, uit het hoogduitsch met eenige byvoegseten door F. van der Breggen. xx+551 pp. 8vo.  
*Amsterdam, 1812*  
 Animal magnetism and its curative powers.

713. (Southey, Robert.) (1774-1843.) Omnia; or Horae Otiosiores. 2 vols. 12mo.  
*London, 1812*  
 In the *Partidas A. D.* 1250, reference is made to the magnetic needle; original Spanish text with English translation p. 213. Southey, the poet laureate, was an accomplished Spanish scholar.

714. **Zamboni**, Giuseppe. (1776-1846.) Della pila elettrica a secco. 55 pp. 3 plates. 8vo.  
*Verona, 1812*  
 Description of the author's "dry" pile, also that of De Luc.  
 —See also 775.

715. **Costa-Saya**, Antonio. Dinamometro magnetico. (Extract, Giorn. del Sc. Contemporanea, Year I., Fasc. 5.) 31 pp. 1 plate. 4to.  
*Messina, 1813*  
 The author's magnetic dynamometer and its use in establishing the law of the inverse square of the distance.

716. (Hodson, F. M.) Encyclopedia Mancuniensis, or, The new school of arts, science and manufactures. Vol. I. (General account of electric phenomena.) 10 plates. 8vo.  
*Manchester, 1813*

716a.—(Another edition.) Vol. I. 8vo.  
*London, 1815*  
 This edition was prepared by Dr. Augustus Chambers.

717. **Macedo**, José Agostinho de. (1770-1831.) Newton, poema. 95 pp. 16mo.  
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 Poem in Portuguese on the achievements of Sir Isaac Newton.

718. **Poisson**, (Siméon Denis.) (1781-1840.) Second mémoire sur la distribution de l'électricité à la surface des corps conducteurs. 112 pp. 4to.  
*(Paris,) 1813*  
 Mathematical investigation of the distribution of charge in the case of two spheres in contact or apart.  
 —See also 823, 1693, 2610.

719. **Signaux** et dictionnaire télégraphiques à l'usage des armées navales. 103 pp. 3 plates. 8vo.  
*Paris, 1813*  
 Signaling with flags.

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720. **Barlow, Peter.** (1776-1862.) A new mathematical and philosophical dictionary; comprising an explanation of the terms and principles of pure and mixed mathematics and such branches of natural philosophy as are susceptible of mathematical investigation. With historical sketches of the rise, progress and present state of the several departments of these sciences, and an account of the discoveries and writings of the most celebrated authors, both ancient and modern. vii+772 pp. 13 plates, tables, diagr. 4to. *London, 1814*  
The author, a distinguished mathematician, is best known by his contributions to terrestrial magnetism and the compensation of ships' compasses.  
—See also 765, 823, 1152, 2555.

721. **Berzelius, J(oens) Jacob.** (1779-1848.) An attempt to establish a pure scientific system of mineralogy, by the application of the electro-chemical theory and the chemical proportions; translated from the Swedish by John Black. 138 pp. 8vo. *London, 1814*  
Work of the great Swedish chemist on the influence of electricity on chemical theory.  
—See also 755.

722. **Higgins, William (Mullinger.)** Experiments and observations on the atomic theory and electrical phenomena. 180 pp. 8vo. *Dublin, 1814*  
Chemical work in which the author puts in a prior claim for the atomic theory against Dalton; heat due to vibratory motion, p. 37.

722a.—*—Expériences et observations sur les théories atomistiques et les phénomènes électriques. (Extrait par M. H. Gaultier de Clanbry.) (Journ. Phys. et Chim., Vol. 84, pp. 392-394.)* 4to. *Paris, 1817*  
—See also 885, 932, 2676.

723. **Mayer, Jo(hann) Tobias.** (1752-1830.) *Commentatio de usu accuratori acus inclinatoriae magneticae.* (Comm. Soc. Sc. Goettingen, Math. Kl., Vol. 3. pp. 3-38) 1 plate. 4to. *Gottingen, 1814*  
Construction and action of the dipping needle.

724. **Schweigger, J(oann) S(alomo) C(hristoph).** (1779-1857.) Ueber die Umdrehung der magnetischen Erdpole und ein davon abgeleitetes Gesetz des Trabanten- und Planetenumlaufes in Briefen an W. Pfaff, nebst einem Schreiben des letztern ueber Kepler's Weltharmonie. 90 pp. 12mo. *Nuremberg, 1814*  
Change in position of the earth's magnetic poles and its influence on the motion of planets.  
—See also 1339, 1371.

725. **Singer, George John.** (1786-1817.) Elements of electricity and electro-chemistry. xxvii+480 pp. 1 plate. 8vo. *London, 1814*  
The principles of static and voltaic electricity with numerous experimental illustrations. Two plates show the deflagration of wires of copper and gold by Leyden jar discharges. (See No. 2528.)

Fac-simile copy of letter dated 5<sup>th</sup> Aug 1816 from Mr (afterwards Sir) John Barrow Secretary of the Admiralty to Mr (afterwards Sir) Francis Ronalds F.R.S relative to the Electric Telegraph.

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Mr Barrow presents his respects  
to Mr Ronalds, and conveys his kind  
wishes in reference to his letter of the 3<sup>rd</sup> Inst,  
that Telegraphic signals heretofore are now  
wholly unnecessary; and that no  
other than the one now in use  
will be adopted.

Answer of Mr Barrow  
5 Aug 1816

Upper Mall,  
20 Hammersmith

729. BARROW.

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725a.—(French translation.) Éléments d'électricité et de galvanisme. Traduit de l'anglais et augmenté de notes par J. B. J. Thillaye. 655 pp. 5 plates. 8vo. *Paris, 1817*  
—See also 2536.

726. (Volta, Alessandro.) (1745-1827.) L'identita del fluido elettrico col così detto fluido galvanico vittoriosamente dimostrata, con nuove esperienze ed osservazioni. Memoria comunicata al signore Pietro Configliachi. E aggiunto il catalogo delle sue opere stampate sino a tutto l'anno 1813. vi+145+vii pp. 8vo. *Pavia, 1814*  
The matter of this volume—the identity of voltaic and galvanic electricity—was dictated by Volta to one of his pupils and edited by professor Configliachi.  
—See also 428.

727. Wedgwood, R(alph.) Book of Remembrance, the outline of an almanack constructed on the ancient cycles of times, and proving, by an harmony of prophetic numbers that this is the predicted era of new things, the final restitution of all things; the fulness of the Gentiles. Also that great Babylon is now fallen, and Satan binding, in the empire and person of Napoleon, etc. (Appendix to vol. I. only published) 2 vols. ill. 24mo. *London, 1814*  
Brief notice of a writing telegraph; see the *Electrician*, July 4, 1862.

728. Forster, Thomas. Researches about atmospheric phenomena. Second edition corrected and enlarged. With a series of engravings illustrative of the modifications of the clouds, etc. xvi+271 pp. 6 plates. 8vo. *London, 1815*  
Work of interest on general meteorology; numerous quotations from classical writers; prevalent superstitions; atmospheric electricity.

728a.—Third edition, corrected and enlarged to which is added the calendar of nature. xiv+448 pp. 6 plates. 8vo. *London, 1823*  
—See also 2523.

729. Barrow, (Sir) John. (1764-1848.) Facsimile copy of letter of August 1816 to Francis Ronalds relative to the electric Telegraph. 1 p. 4to. *1816*  
The message of the letter is "Telegraphs of any kind are now wholly unnecessary."  
—See also 670.

730. Donovan, M(ichael.) (1790-?) Essay on the origin, progress and present state of galvanism; containing investigations, experimental and speculative of the principal doctrines offered for the explanation of its phenomena; and a statement of a new hypothesis. xviii+390 pp. 1 plate. 8vo. *Dublin, 1816*  
History and discussion of the early theories of voltaic electricity.  
—See also 2526.

may, by possibility not have reached you, also  
although it has been obscurely made known  
in London, namely that Volta proposed  
an electric telegraph in 1777. Amongst his  
 MSS. an autograph addressed to Bartolotti  
(probably) contains accounts of sundry  
experiments with his gas-pistols, and a  
proposal ("proposta") to transmit signals  
by means of ordinary electricity, this is  
dated Como 15 April 1777. This much  
is stated by Prof. Magrini in a paper in  
the "Atti del R Istituto Lombardo di Scienze"  
Vol 2. I learn from Sig: Z. Volta that  
his father proposed to communicate with  
Milan (for Como) & to employ his Electro  
phorus in charging the wire (or wires) but  
I cannot ascertain whether he proposed to  
charge the wire (or wires) by means of sparks  
given to it from the upper separated shield  
of that instrument, or whether the lower earth-  
ing was to be retained in constant com-  
munication with the wire, & the signal  
made by means of the passage of a spark of

731. VOLTA'S TELEGRAPH. (For entry, see No. 3253a.)

the charge (of that Coating <sup>so</sup>) into the wire, ~~at the time of~~  
by separating the shield & insulating the  
lower Coating (about) simultaneously. I think  
that the latter must have been his plan  
for would it not be less wastfull? ~~than~~  
~~less~~ There are 2 large Electrophones in his  
Collection but they are very much too small  
for Telegraphic purposes of any considerable  
extent. Perhaps he would have used some  
such contrivances as that of his friend Lieb-  
tentz <sup>of</sup> Weber or a still larger &  
improved scale?

Pray excuse this gossip (useless) and  
believe that on my return to Home one of the  
first objects will be that of witnessing your  
last improvements in Telegraphy.

Yours Dear Sir  
gratiously & faithfully  
Dr. Ronalds

Lathmer Clark Esqre

CATALOGUE OF WHEELER GIFT

731. **Volta, (Alessandro.)** (1745-1827.) *Collezione dell opere del cavaliere conte Alessandro Volta.* 3 vols. in 5. pl. portr. 8vo. *Florence, 1816*  
 Part I. Vol. 1. The electrophorus, p. 103; electrical condensation, p. 219; Vol. 2, animal electricity; Part II. Vol. 1, clouds electrified by friction sometimes positively and sometimes negatively, p. 270; the aurora borealis, p. 428; Part II, Vol. 2, letter to Sir Joseph Banks announcing discovery of battery, p. 95. (See No. 2497.) For early work on electric telegraph, see Ronald's letter, No. 3253a (reproduced on preceding pages.)  
 —See also 428.

732. **Weber, Joseph.** (1753-1831.) *Vom dynamischen Leben der Natur ueberhaupt, und vom elektrischen Leben im Doppeltelektrophor insbesondere,* 151 pp. 12mo. *Landshut, 1816*  
 Experiments with the electrophorus.  
 —See also 477.

733. **Bain, William.** (1775-1853.) *Essay on the variation of the compass; with observations and remarks.* 140 pp. 1 map. 8vo. *Edinburgh, 1817*  
 Discussion of agonic lines, magnetic dip, variation and direction of ship's head; Flinder's rules.

734. **Biot, J(ean) B(aptiste).** (1774-1862.) *On the laws of terrestrial magnetism in various parts of the earth.* Translated with notes, by T. S. Evans, 24 pp. 1 plate. 8vo. *London, 1817*  
 Chapter from the author's *Traité de Physique*, 1816.  
 —See also 633.

735. **Bompass, Charles Carpenter.** *Essay on the nature of heat, light and electricity.* x+266 pp. 8vo. *London, 1817*  
 The nature of electric attraction is discussed, electricity being considered a material entity; turmaline, p. 236; cause of magnetism, a peculiar ethereal fluid, p. 247.

736. **Bondioli, Pietro Antonio.** (1765-1808.) *Sopra l'aurora boreale.* (Nuovi Saggi sc. e lett. Acad. Sc. Padova, Vol. 1, pp. 55-79.) 12mo. *Padua, (1817)*  
 This pamphlet contains a long letter from Volta on the cause of polar auroreæ.

737. **Clark, Hewton, and John Dougall.** (1787-1832?) *Cabinet of arts; or General instructor in arts, science, trade, practical machinery.* 859 pp. 7 plates. 8vo. *London, 1817*  
 A short section on electricity and another on magnetism.

738. **(Gregory, Olinthus Gilbert.)** (1774-1841.) *Dissertation on weights and measures and the best means of revising them.* 40 pp. 8vo. *London, 1817*  
 Pamphlet containing points of historic interest on standards.  
 —See also 811, 1142.

739. **Macdonald, John.** (1759-1831.) *Naval, military and political telegraphic dictionary numerically arranged.* 8vo. *London, 1817*  
 Comprehensive telegraphic dictionary in which numbers stand for words; it cost the author 15 years of continued work.  
 —See also 689.

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740. **Oppian.** (Second century.) *Les Halieutiques traduits du Grec du poème d'Oppien, ou traité de la pêche et des moeurs des habitans des eaux, par J. M. Limes.* 396 pp. 1 plate. 8vo. *Paris, 1817*  
*Poetic description of the electric powers of the torpedo fish, p. 88, by the celebrated Greek poet.*

741. **Ozeray,** Michel-Jean-François. (1764-1859.) *Recherches sur Buddou ou Bouddou (Foe), instituteur religieux de l'Asie orientale; précédées de considérations générales sur les premiers hommages rendus au Créateur; sur la corruption de la religion, l'établissement des cultes du soleil, de la lune, des planètes, du ciel, de la terre, des montagnes, des eaux, des forêts, des hommes et des animaux.* xxxv+137 pp. 8vo. *Paris, 1817*  
*Religion and practices of the Buddhists.*

742. **Achmed,** Tefaschius. *Fior di pensieri sulle pietre preziose, opera stampata nel suo originale Arabo, colla traduzione Italiana appresso, e diverse note di Antonio Rainieri.* 31 l.+118 pp. 4to. *Florence, 1818*  
*Work on precious stones with a few pages on the magnet and its properties: Arabic text with Italian translation.*

743. **Bostock,** John. (1774-1846.) *Account of the history and present state of galvanism.* 164 pp. 2 plates. 8vo. *London, 1818*  
*The greater part of the work is a critical history of the subject; the rest treats of the theories advanced by Galvani and Volta.*

744. **Clarke,** George. *Treatise on the magnetism of the needle; on the Great Luminary, or reservoir of light called the Sun; the properties of light, etc.* 24 pp. 12mo. *London, 1818*  
*"The sun's path at the equator being east and west, it is evident that its attraction for oxygen must be north and south and constitutes the magnetism of the needle", p. 12. (First edition published, 1816).*

745. **Delafosse,** (Gabriel.) (1796-1878.) *Mémoire sur l'électricité des minéraux.* (Ann. Mines, Vol. 3 pp. 209-226) 8vo. *Paris, 1818*  
*Electrification of certain minerals by rubbing and by heating.*

746. **Joyce, J(eremiah.)** (1763-1816.) *Scientific dialogues, in which the first principles of natural and experimental philosophy are fully explained.* Vol. 6: *Electricity and Galvanism.* 16mo. *London, 1818*  
*The elements of natural philosophy. (A complete set comprises 7 vols.)*

746a.—(New edition.) *Scientific dialogues. Intended for the instruction and entertainment of young people: in which the first principles of natural and experimental philosophy are fully explained. By the Rev. Jeremiah Joyce, with corrections by Dr. Olinthus Gregory. A new and enlarged edition containing the recent additions to science. By Charles V(incent) Walker.* xvi+495 pp. ill. diagr. *London, 1853*

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747. **La Beaume** (Michael.) Observations on the properties of the air-pump, vapour-bath, pointing out their efficacy in the cure of gout, rheumatism, palsy, etc., with remarks on factitious airs and on the improved state of medical electricity. 88 pp. 8vo. (London, 1818?)  
—See also 770, 843, 868, 923.

748. **Lynn, Thomas.** Improved system of telegraphic communication. Second edition carefully revised and improved. (Continuation of the General Vocabulary. Supplementary Vocabulary) xxxvi pp. ill. 3 plates. 12mo. London, 1818  
Signalizing with flags.

749. **Maissiat**, (Michel.) (1770-1822.) Mémoire sur quelques changements faits à la boussole et au rapporteur, suivi de la description d'un nouvel instrument, nommé grammomètre servant à disposer sur les plans et cartes, les hauteurs et l'inclinaison des écritures et à diviser, sans compas, les lignes droites. 178 pp. 8 plates. 8vo. Paris, 1818  
Construction and use of the surveying compass preceded by a short history of the mariner's compass.

750. **Marryat, Frederick.** (1792-1848.) Code of signals for the use of vessels employed in the Merchant Service; including a cypher for secret correspondence. Added a list of the agents to Lloyd's. Second edition. 3 plates. L. 8vo. London, 1818  
Signalizing with flags.

750a.— Universal code of signals for the mercantile marine of all nations, with a selection of sentences adapted for convoys, and systems of geometrical, night and fog signals. By G. B. Richardson. 7 plates. 8vo. London, 1864  
Practical handbook of flag-signaling.

751.\* **Salgues, J(acques) B(arthélémy.)** (1760-1830.) Des erreurs et des préjugés répandus dans les diverses classes de la société. Troisième édition, revue et corrigée. 3 vols. 8vo. Paris, 1818-1823  
Discussion of erroneous views popularly entertained concerning the divining-rod, lightning conductors, thunderbolts and the ringing of bells during thunderstorms.

752. **Vene, A.** Essai sur une nouvelle théorie de l'électricité contenant une réfutation du système des deux fluides vitré et résineux et une explication de plusieurs phénomènes météorologiques. 118 pp. 1 plate. 8vo. Arras, (1818?)  
The author admits only one electrical fluid held in a body by molecular attraction.

753. **Vogel, (Johann) Ludwig (Andreas.)** (1771-1840.) Die Wunder des Magnetismus. 280 pp. 8vo. Erfurt, (1818)  
Chapter on animal electricity.

CATALOGUE OF WHEELER GIFT

754.† **Aldini, Giovanni.** (1762-1834.) General views on the application of galvanism to medical purposes principally in cases of superseded animation. viii+96 pp. 8vo. *London, 1819*  
 Apparatus and application in certain cases of difficult breathing or suspended animation. Sulzer's experiment on "Galvanic taste" anticipating Galvani and Volta.  
 —See also 575.

755. **Berzelius, Joens Jacob.** (1779-1848.) *Essai sur la théorie des proportions chimiques et sur l'influence chimique de l'électricité, traduit du Suédois sous les yeux de l'auteur et publié par lui-même.* xvi+190+120 pp.+1 l. 8vo. *Paris, 1819*  
 Electricity, the cause of chemical affinity; light and heat are some of its modifications, p. 91.  
 —See also 721.

756. **Hansteen, Christopher.** (1784-1873.) *Untersuchungen ueber den Magnetismus der Erde, uebersetzt von P. Treschow Hanson.* Part 1. With Atlas. xxx+502+148 pp. 7 maps, 5 plates. 4to. Folio. *Christiania, 1819*  
 The fifth chapter deals with the mathematical theory of magnetism; the author favors Halley's views regarding terrestrial magnetism, which assign to the earth two magnetic axes. (See Nos. 2649, 2698.)  
 —See also 860, 1018, 1321, 1458, 2575bis.

757. **Macdonald, John.** (1759-1831.) Circumstantial and explanatory account of experiments lately made at the Royal Artillery Dépôt at Woolwich, with a view of ascertaining the comparative accuracy of the relative times of burning of fuzes driven by a machine, opposed to those of the common description, with a correspondence carried on in the years 1817 and 1818 on this and other important branches of the science of artillery. liv+272 pp. pl. 8vo. *London, 1819*  
 The appendix contains lengthy account of signaling by means of mechanical telegraphs.  
 —See also 689.

758. **Mitchell, James.** (1786-1844.) Elements of natural philosophy, illustrated by experiments which may be performed without regular apparatus. xx+362 pp. 1 plate. 12mo. *London, 1819*  
 Elementary textbook; magnetic declination, p. 279.  
 —See also 834.

759. **Muncke, G(eorg) W(ilhelm.)** (1772-1847.) *Anfangsgruende der Naturlehre.* 2 vols. 2 plates. 8vo. *Heidelberg, 1819-1820*  
 Textbook with chapters on electricity and magnetism.  
 —See also 850.

760. **Redern, (Sigismond Ehrenreich von.)** On the sentient faculty, and principles of human magnetism; translated from the French and elucidated with notes by Francis Corbaux. 217 pp. 8vo. *London, 1819*  
 Brief history of mesmerism.

CATALOGUE OF WHEELER GIFT

761. **Marum, Martin van.** (1750-1837.) Sur la théorie de Franklin, suivant lequel les phénomènes électriques sont expliqués par un seul fluide. 29 pp. 1 plate. 8vo. (Harlem,) 1819  
The one-fluid theory of electricity and its modification by Aepinus.

761a.——Observations on a memoir. "On the theory of Franklin according to which electrical phenomena are explained by a single fluid." Read at the Royal Institution of Sciences at Amsterdam by M. Martin van Marum. (Ann. of Philos. N. S. Vol. I, pp. 181-186.) 1 plate. 8vo. London, 1821  
"Franklin impeded the progress of science by his hypothesis respecting electricity which seems inevitably doomed to death," p. 182.  
—See also 461.

762. **Ampère, André Marie.** (1775-1836.) Mémoires sur l'action mutuelle de deux courants électriques, sur celle qui existe entre un courant électrique et un aimant ou le globe terrestre, et celle de deux aimans, l'un sur l'autre. (Ann. Chim. Phys., Vol. 15, pp. 59-76+170-218) 5 plates.—Conclusions de Mémoires. 2 pp. 8vo. 4to. Paris, 1820  
Three classical papers on the fundamental principles of electro-dynamics.  
(See No. 838bis.)

763.——Notes sur les lectures qu'il a faites à l'Académie des Sciences. (On the mutual action of two electrical elements and on electro-magnetism.) (Journ. Phys. Vol. 91, pp. 226-230; Vol. 92, pp. 304-309) 4to. Paris, 1820-1821  
Abstract of the author's communications to the French Academy in 1820-1821.

763a.——Note sur un mémoire lu à l'Académie Royale des Sciences dans la séance du 4 Dec. 1820 (Extract, Journ. Phys., 1820) 4 pp. 4to.  
—See also 777, 784, 796, 838bis, 1853, 1930bis, 2561.  
Paris, 1820

764. **Barclay, John.** Elements of natural and experimental philosophy. xvii+450 pp. ill. 5 plates. 12mo. London, 1820  
General phenomena of electricity and magnetism.

765. **Barlow, Peter.** (1776-1862.) Essay on magnetic attractions; particularly as respects the deviation of the compass on ship-board occasioned by the local influence of the guns, etc., with an easy practical method of observing the same in all parts of the world. xii+145 pp. 1 plate. 8vo.  
London, 1820  
Experiments made to ascertain the local attraction of ship's guns on the compass. Remarks on the reversal of polarity in steel bars, p. 124; Morichini's observation of the supposed magnetic effect due to violet rays, p. 130; beams of magnetic matter in the atmosphere p. 131.

765a.——Essay on magnetic attractions and on the laws of terrestrial and electro-magnetism comprising a popular course of curious and interesting experiments on the latter subject, and an easy experimental method of correcting the local attraction of vessels on the compass in all parts of the world.

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## PREMIER MEMOIRE.

*De l'Action exercée sur un courant électrique,  
par un autre courant, le globe terrestre ou un  
aimant.*

### § 1<sup>er</sup>. *De l'Action mutuelle de deux courants électriques.*

**L**'ACTION électro-motrice se manifeste par deux sortes d'effets que je crois devoir d'abord distinguer par une définition précise.

J'appellerai le premier *tension électrique*, le second *courant électrique*.

Le premier s'observe lorsque les deux corps entre lesquels l'action électro-motrice a lieu sont séparés l'un de l'autre (1) par des corps non conducteurs dans tous les points de leur surface autres que ceux où elle est établie ; le second est celui où ils font, au contraire, partie d'un circuit de corps conducteurs qui les font communiquer par des points de leur surface différens de ceux où se produit l'action électro-motrice (2). Dans le premier

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(1) Quand cette séparation a lieu par la simple interruption des corps conducteurs, c'est encore par un corps non conducteur, par l'air, qu'ils sont séparés.

(2) Ce cas comprend celui où les deux corps ou systèmes de corps entre lesquels a lieu l'action électro-motrice, seraient en communication complète avec le réservoir commun qui ferait alors partie du circuit.

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Second edition, much enlarged and improved. Illustrated with plates by Lowry. xii+303 pp. 6 plates. 8vo.

*London, 1823*

Important additions made to the first edition; rate of chronometer as affected by magnetism of ships; the author's two-fluid theory; magnetic action of iron spheres, bars and masts; experiments in electro-magnetism. (See Nos. 2571, 2655a.)

—See also 720.

766. **Delambre**, (Jean Baptiste Joseph.) (1749-1822.) *Mémoires contenant des expériences relatives à l'action mutuelle de deux courants électriques, et à celle qui existe entre un courant électrique et le globe de la terre ou un aimant; par M. Ampère.* (Extract, *l'Analyse des travaux de l'Académie des Sciences, Partie Mathématique*) 15 pp. 4to. *Paris, 1820*  
The mutual action of conductors conveying currents; Ampère's laws; Arago's discoveries in electromagnetism, 1820.

—See also 703.

767. **Gregory**, G(eorge.) (1754-1808.) *Lectures on experimental philosophy, astronomy and chemistry.* Second edition. 2 vols. 35 plates. 12mo. *London, 1820*  
Two short lectures on electricity.

—See also 598.

768. **Hachette**, (Jean Nicholas Pierre.) (1769-1834.) *Sur les expériences électro-magnétiques de MM. Oersted et Ampère.* (Journ. Phys., Vol. 91, pp. 161-169) 4to. *Paris, 1820*  
Use of mariner's compass in France in 1260, p. 1; Oersted's experiment, p. 2; polarity of ship's compass reversed by lightning, p. 4; Ampère's experiments with solenoids, p. 5; magnetic action of current through battery itself, p. 5; action of earth on conductor carrying current, p. 7.

769. **Hare**, R(obert.) (1781-1858.) *Memoir on some new modifications of galvanic apparatus, with observations in support of his new theory of galvanism.* 17 pp. 1 plate. 8vo.

*(Philadelphia), (1820?)*

Description of "deflagration." Dr. Hare was a distinguished American chemist and physicist.

—See also 683.

770. **La Beaume**, (Michael.) *Remarks on the history and philosophy, but particularly on the medical efficacy of electricity in the cure of nervous and chronic disorders and in various local affections, as blindness, deafness, etc., together with observations on galvanism as an efficient substitute for mercurial remedies in bilious and stomach complaints.* Second edition, greatly enlarged. xix, 21-273 pp. 2 plates. 12mo. *London, 1820*

Brief history of electricity; its properties and curative powers in cases of nervous and chronic disorders.

—See also 747.

771. **Lapostolle**, (Alexandre Ferdinand Leonce.) *Traité des parafoudres et des paragrèles en cordes de paille précédé*

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d'une météorologie électrique présentée sous un nouveau jour et terminée par l'analyse de la bouteille de Leyde. v+ 320 pp.—Premier Supplement: Appel à l'opinion publique, ou Réponse à un rapport fait à l'Académie Royale des Sciences de Paris, dans sa séance du 24 juillet, 1820. 24 pp. 8vo.

Amiens, 1820

After considering the effects of lightning and describing his straw-rope lightning-rod, the author proposes similar means to prevent the destruction of crops by hailstorms.

772. **Lecount**, P(eter.) A description of the changeable magnetic properties possessed by all iron bodies, and the different effects produced by the same on ships' compasses, from the position of the ship's head being altered. 55 pp. ill. 8vo.

London, 1820

General theory and practise of compass compensation.

773. **Oersted**, H(ans) C(hristian.) (1770-1851.) Experimenta circa effectum conflictus electrici in acum magneticam. 4 pp. Sm. 4to.

Copenhagen, 1820

The celebrated and excessively rare four-page announcement of the discovery of the magnetic effect of the electric current. A translation into English, dated July 21, 1820, was made by Oersted for Thomson's *Annals of Philosophy* (pp. 273-275, vol. xvi., 1820), to which is appended a note by the author as follows: "I have demonstrated in a book published five years ago that heat and light consist of the conflict of the electricities. From the observations now stated, we may conclude that a circular motion likewise occurs in these effects." The Latin text and an English translation by Rev. J. E. Kempe, accompanied by a fac-simile signature and brief biography of Oersted, are printed in the *Journal of the Society of Telegraph Engineers*, vol. v., 1876, pp. 459-469.

773a.——(French translation.) Expériences sur un effet que le courant de la pile excite dans l'aiguille aimantée. (Journ. Phys. Chim. et d'Hist. Nat., Vol. 91, pp. 72-80.) 1 plate. 4to.

Paris, 1820

The magnetic effect of the electric current discovered by the author; also note by Ampère containing the electrodynamical laws.

—See also 1184, 2580.

774. **Seebeck**, (Johann Thomas). (1770-1831.) Ueber den Magnetismus der galvanischen Kette. (Abh. Akad. Wiss. Berlin, 1820-1821, pp. 289-346) 3 plates. 4to. Berlin, 1820-1821

Action of the electric current on a magnetic needle; research on the Oersted effect. Seebeck's earliest magnetic work of importance.

—See also 806.

775. **Zamboni**, Giuseppe. (1776-1846.) L'elettromotore perpetuo. Trattato. Parte prima e seconda. 298+361 pp. Ill. 8vo.

Verona, 1820-1822

General electrical phenomena; details of the author's "dry" pile.

—See also 714.

776. **Althaus**, Julius von. (1791-?) Versuche ueber den Elektromagnetismus nebst einer kurzen Pruefung der Theorie des

# EXPERIMENTA

## CIRCA EFFECTUM

### CONFICTUS ELECTRICI IN ACUM MAGNETICAM.

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Prima experimenta circa rem, quam illustrare aggredior, in scholis de Electricitate, Galvanismo et Magnetismo proxime-superiori hieme a me habitis instituta sunt. His experimentis monstrari videbatur, acum magneticam ope apparatus galvanici e situ moveri; idque circulo galvanico cluso, non aperto, ut frustra tentaverunt aliquot abhiuc annis physici quidam celeberrimi. Cum autem hæc experimenta apparatu minus efficaci instituta essent, ideoque phænomena edita pro rei gravitate non satis fulcuenta vidarentur, socium adscivi amicum Esmarch, regi a consilio justiæ, ut experimenta cum magno apparatu galvanico, a nobis conjunctim instructo, repeterentur et augerentur. Etiam vir egregius Wleugel, eques auratus ord. Dan. et apud nos præfector rei gubernatorię, experimentis intersuit, nobis socius et testis. Præterea testes facrunt horum experimentorum vir excellentissimus et a rege summis honoribus decoratus Hauch, cuius in rebus naturalibus scientia jam diu inclaruit, vir acutissimus Reinhardt, Historiæ naturalis Professor, vir in experimentis instituendis sagacissimus Jacobsen, Medicinæ Professor, et Chemicus experientissimus Zeise, Philosophia Doctor. Sæpius equidem solus experimenta circa materiam propositam institui, quæ autem ita mihi contigit detegere phænomena, in conventu horum virorum doctissimorum repetivi.

In experimentis recensendis omnia præteribo, quæ ad rationem rei inveniendam quidem conduxerunt, hac autem inventa rem amplius illustrare nequeunt; in eis igitur, quæ rei rationem perspicue demonstrant, acquiescamus.

Apparatus galvanicus, quo usus summus, constat viginti receptaculis cupreis rectangularibus, quorum et longitudo et altitudo duodecim æqualiter est pollicum, latitudo autem duos pollices et dimidium vix excedit. Qvodvis receptaculum duabus laminis cupreis instructum est ita inclinatis, ut baculum cupreum, qui laminam zincæam in aqua receptaculi proximi sustentat, portare possint. Aqua receptaculorum  $\frac{1}{2}$  sui ponderis acidi sulphurici et pariter  $\frac{1}{2}$  acidi nitrici continet. Pars cujusque laminæ Zincæ in aqua submersa Quadratum est, cuius latus circiter longitudinem 10 pollicum habet. Etiam apparatus minores adhiberi possunt, si modo filum metallicum candeſacere valeant.

773. OERSTED. (Reduced.)

CATALOGUE OF WHEELER GIFT

Herrn Ampère; mit einer Vorrede vom Hofrath Muncke. 57  
pp. 1 plate. 12mo. *Heidelberg, 1821*  
Remarks on Ampère's electrodynamical experiments.

777. **Ampère**, (André Marie.) (1775-1836.) Réponse à la lettre de M. van Beek, sur une nouvelle expérience électro-magnétique. (Journ. Phys. Chim. et d'Hist. Nat., Vol. 93, pp. 447-467) 4to. *Paris, 1821*  
Reply to van Beek's criticism. (See No. 783.)  
—See also 762.

778. **Cumming**, J(ames.) (1777-1861.) On the application of magnetism as a measure of electricity. (Trans. Cambridge Philos. Soc., Vol. 1, pp. 15-20) 1 plate. 4to. *Cambridge, 1821*  
Early form of the tangent galvanometer; first recorded use of a wire surrounding a pivoted needle to measure strength of current.  
—See also 786, 827, 2572.

779. **Enfield**, W(illiam.) Scientific amusements in philosophy and mathematics; including arithmetic, acoustics, electricity, magnetism, optics, pneumatics, together with amusing secrets in various branches of science. xii+276 pp. 1 plate. 12mo. *London, 1821*

780. **Erman**, P(aul.) (1764-1851.) Umriss zu den physischen Verhältnissen des von Herrn Oersted entdeckten elektrochemischen Magnetismus. 112 pp. 1 plate. 2 tables. 8vo. *Berlin, 1821*  
Observations and experiments on the effect of a current on the dipping and compass needles; Zamboni's "pile".

781. **Oersted**, J. B. Considérations sur l'électro-magnétisme. (Journ. Phys. Chim. et d'Hist. Nat., Vol. 93, pp. 161-180) 1 plate. 4to. *Paris, 1821*  
Researches on electro-magnetism.

782. **Schrader**, C. De electro-magnetismo. Quam consensu illustris medicorum ordinis in inclyta Academia Fridericiana Halensi defendit. 35 pp. 1 plate. 8vo. (Dissertatio inauguralis medico-physica.) *Halle, 1821*  
Schweigger's multiplier; some medical uses of the voltaic current.

783. **Beek**, A(lbert) van. (1787-1856.) Lettre à M. Ampère. (Journ. Phys. Chim. et d'Hist. Nat., Vol. 93, pp. 312-320) 4to. *Paris, 1821*  
Remarks on Ampère's theory of magnetism. (See No. 777.)

784. **Ampère**, (André Marie.) (1775-1836.) Recueil d'observations électro-dynamiques, contenant divers mémoires, notices, extraits de lettres, relatifs à l'action mutuelle de deux courants électriques, à celle qui existe entre un courant électrique et un aimant ou le globe terrestre et à celle de deux aimants l'un sur l'autre. 344 pp. 9 plates. 8vo. *Paris, 1822*  
The author's classical investigations in electro-dynamics together with experimental illustrations. Also a paper by *De la Rive* on the action of the earth on a movable circuit carrying a current.

CATALOGUE OF WHEELER GIFT

785.— —Notice sur les nouvelles expériences électro-magnétiques faites par différens physiciens, depuis le mois de mars 1821. (Journ. Phys. Chim. et d'Hist. Nat., Vol. 94, pp. 61-66) 4to. *Paris, 1822*  
 Brief exposition of the author's theory of magnetism.  
 See also 762.

786. Cumming, J(ames). (1777-1861.) On the connexion of galvanism and magnetism. (Trans. Cambridge Philos. Soc., Vol. I, pp. 269-280) 4to. *Cambridge, 1822*  
 Discussion of several effects of the current especially its action on a magnetic needle.  
 —See also 778.

787. Faraday, Michael. (1791-1867.) Description of an electro-magnetical apparatus for the exhibition of rotatory motion. (Quart. Journ. Sc., Vol. 12, pp. 283-285) 1 plate. 8vo. *London, 1822*  
 Rotation of a current round the pole of a magnet. (Autograph copy).

787a.— —Note on new electro-magnetical motions. (Quart. Journ. Sc., Vol. 12, pp. 416-421) 8vo. *London, 1822*  
 —See also 959, 1282, 1353, 1488, 2549.

788. Luscombe, E(dmund) and M(atthias) Luscombe. Langue télégraphique universelle, ou, Code de signaux adoptés dans les marines marchandes de France et d'Angleterre et transmis par ordre du gouvernement britannique aux commandants de tous les bâtiments du Roi, pour leur servir de communication avec les navires marchands, adapté à l'usage du commerce maritime de France. 3 plates. 8vo. *Havre, (1822?)*  
 Flags for signaling in the navy; the authors are said to have been the first to use colored flags for the purpose.

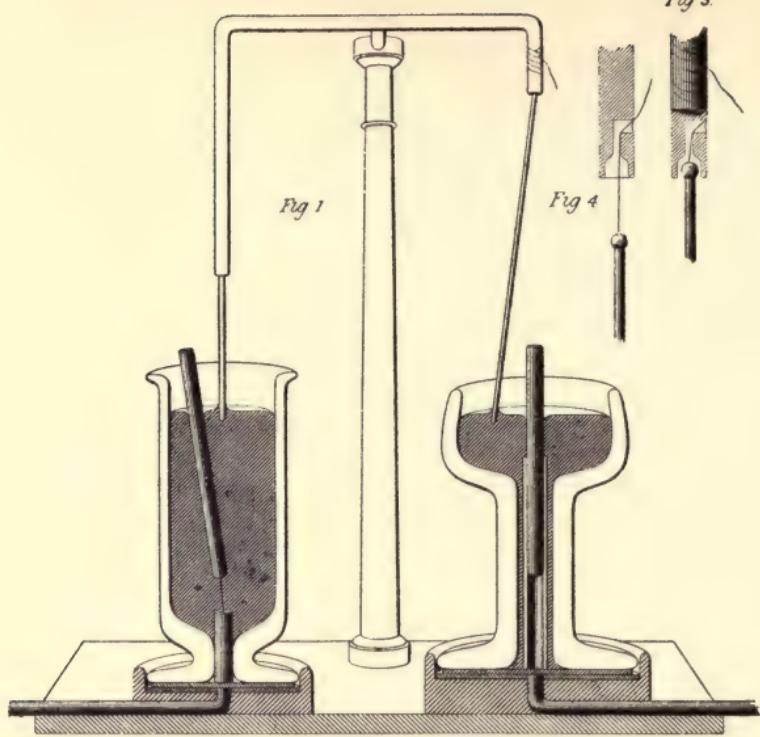
789. Moll, G(erit.) (1785-1838.) Sur des expériences électro-magnétiques. (Journ. Phys. Chim. et d'Hist. Nat., Vol. 94, pp. 379-388) 4to. *London, 1822*  
 Magnetization of needles by the current.

790. Roberts, G(eorge.) Catechism of electricity. Second edition. (Pinnock's Catechisms) 71 pp. ill. 16mo. *Berlin, (1822)*  
 —See also 826.

791. Robison, John. (1739-1805.) System of mechanical philosophy, with notes by David Brewster. 4 vols. 8vo. *Edinburgh, 1822*  
 Lengthy treatment of static electricity; discussion of magnetic declination, its cyclic and irregular changes. Earthquakes and the compass, p. 371.

792. Heyden, J. M. van der. Lettre à M. Ampère. (Journ. Phys. Chim. et d'Hist. Nat., Vol. 94, pp. 67-71) 4to. *Paris, 1822*  
 Reference to the author's memoir on electro-magnetism.

793.— —Mémoire sur l'électro-magnétisme. (Journ. Phys. Chim. et d'Hist. Nat., Vol. 94, pp. 284-296+321-344) 1 plate. 4to. *Paris, 1822*  
 Series of electro-magnetical experiments.



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J. D. Taylor

London Published by J. Murray, Albemarle Street, January 1, 1822.

787. FARADAY. (Reduced.)

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794. **Wit, Aegidius de.** *Responsio ad quaestionem propositam: Describantur, et quantum id experientia duce fieri potest, explicentur acus magneticae phaenomena.* Ostendatur illius usus in nautica arte, atque viae maxime expeditae, quibus eius declinatio, inclinatio, atque vis magneticae, qua praedita est, intensitas, definiri possint. (Ann. Acad. Rheno-Trajectinae, 1821-1822) 78 pp. 1 plate. 8vo. *Utrecht, 1822*  
This dissertation offers a physical explanation of magnetic attraction, repulsion, declination and dip.

795. **Primum mobile; or, Solar repulsion; being a query concerning the primary cause of motion in the solar system, as connected with gravity.** By the Author of "Creation," a poem. 11+264 pp. 1 plate. 8vo. (Privately printed.) *Liverpool, 1822*  
Speculations on the cause of the changes in magnetic declination, the nature of negative electricity, the zodiacal light, and polar aurorae.

796. **Ampère, (André Marie.)** (1775-1836.) *Exposé méthodique, des phénomènes électro-dynamiques et des lois de ces phénomènes* (Journ. Phys. Chim. et d'Hist. Nat., Vol. 96, pp. 248-257) 4to. *Paris, 1823*  
Consecutive account of electrodynamic phenomena beginning with the mutual repulsion of the elements of a rectilinear current.  
—See also 762.

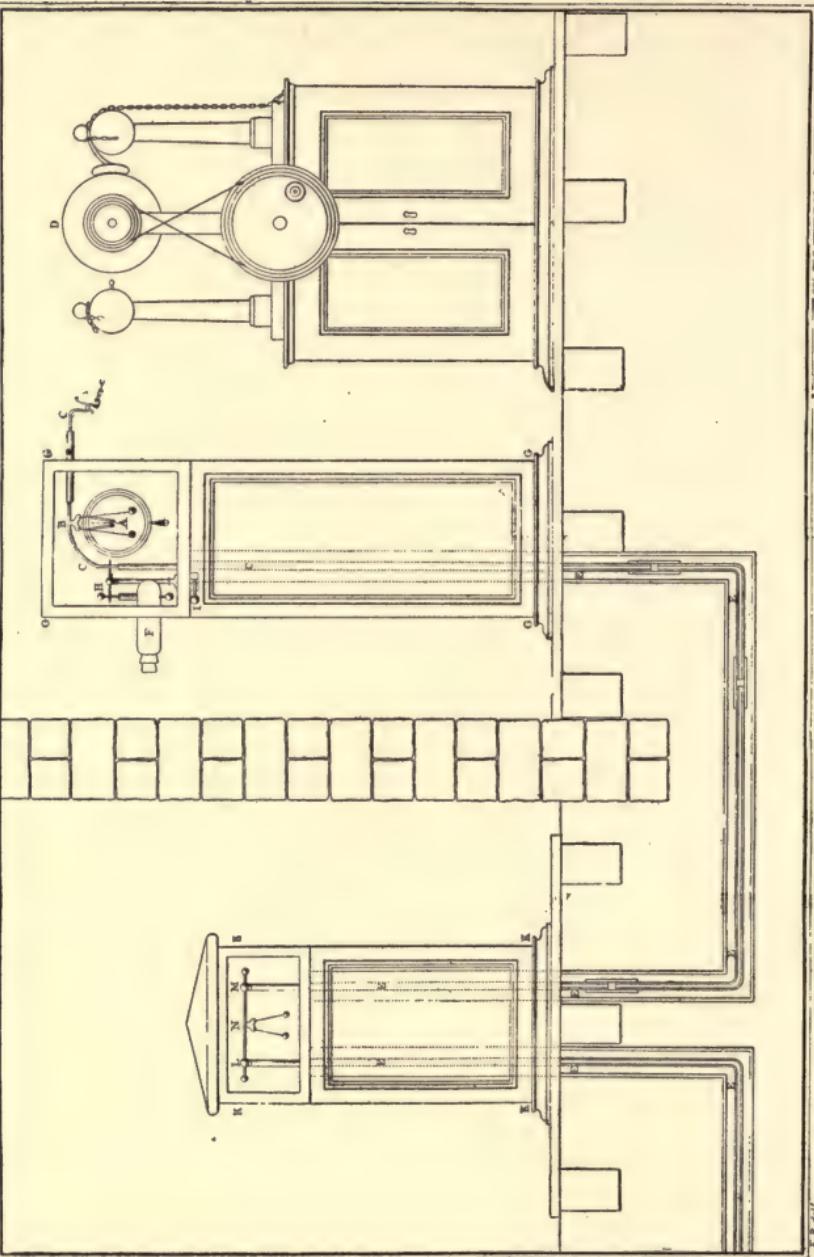
797. **Demonferrand, J(ean) B(aptiste) F(irmin.)** (1795-1844.) *Manuel d'électricité dynamique, ou, traité sur l'action mutuelle des conducteurs électriques et des aimants.* 210 pp. 10 plates. 8vo. *Paris, 1823*  
Fundamental phenomena and laws of electro-dynamics. (See No. 827.)

798. **Donker, Curtius Boudewin.** *Commentatio ad quaestionem physicam de convenientia atque differentia effectuum tensionis electricae et fluxus electrici.* 53 pp. 4to. *Leyden, 1823*  
Electro-magnetic phenomena; Ampère's theory.

799. **Eyk, S. Speyert van der.** *Verhandeling over het electro-magnetismus.* 30 pp. 1 plate. 8vo. *Harlem, 1823*  
Polarity and magnetic action of solenoids.

800. **Ferguson, James.** (1710-1776.) *Essays and treatises, with an appendix relative to electricity, galvanism and electro-magnetism* by David Brewster. v+382 pp. 14 plates. 8vo. *Edinburgh, 1823*  
Forty pages on elementary electricity.  
—See also 429.

801. **Harris, (Sir) William Snow.** (1792-1867.) *Observations on the effects of lightning on floating bodies, with an account of a new method of applying fixed and continuous conductors of electricity to the masts of ships; in a letter addressed to Sir Thomas Byam Martin.* 89 pp. 5 plates. 4to. *London, 1823*  
—See also 838, 841, 1019, 1043, 1114, 1143, 1180, 1230, 1358, 1676, 2556.



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802. **Kaemtz**, Ludwig Friedrich. (1801-1867.) *De legibus repulsionum electricarum mathematicis.* (Inaugural dissertation.) 29 pp. 1 plate. 8vo. *Halle, 1823*  
Criticism of the evidence given by Coulomb and others for the law of the inverse square of the distance.  
—See also 1076.

803. **Ronalds**, (Sir) Francis. (1788-1873.) Descriptions of an electrical telegraph and of some other electrical apparatus. 83 pp. 8 plates. 8vo. *London, 1823*  
Buried conductors, p. 17; experiments on atmospheric electricity, p. 28; "dry" pile, p. 66. Account of experiments on signaling by static electricity undertaken in 1816. The apparatus of Ronalds was the prototype of electrical dial-telegraphs; pamphlet of historic interest. (See No. 729.)

803a.—Description of an electrical telegraph. Second edition. 25 pp. 4 plates. 8vo. *London, 1871*  
—See also 846, 1149, 1338, 2207, 2534.

804. **Savary** (Savart Felix). (1797-1841.) *Mémoire sur l'application du calcul aux phénomènes électro-dynamiques.* 26 pp. 1 plate. 4to. *Paris, 1823*  
Discussion of Ampère's mathematical formulae.  
—See also 2612.

805. **Scoresby**, William. (1780-1857.) Description of a magnetometer, being a new instrument for measuring magnetic attractions, and finding the dip of the needle; with an account of experiments made with it. (Trans. Roy. Soc. Edinburgh, Vol. 9, pp. 243-258) 1 plate. 4to. *Edinburgh, 1823*  
The paper contains a number of remarks and experiments on magnets in general; illustration of the author's dipping needle.  
—See also 1070, 1466, 2545.

806. **Seebeck**, (Johann Thomas.) (1770-1831.) *Magnetische Polarisation der Metalle und Erze durch Temperatur-Differenz.* (Abh. Akad. Wiss. Berlin, 1822-1823, pp. 265-373) 2 plates. 4to. *Berlin, 1823*  
Researches in thermo-electricity; the author was one of the earliest investigators.  
—See also 774.

807. **Smith**, James. Panorama of science and art. 2 vols. 1 plate. 8vo. *Liverpool, 1823*  
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808. **Yelin**, Julius (Konrad) von. (1771-1826.) *Neue elektro-magnetische Versuche; die magneto-motorische Wirkung der fluessigen Saeuren, Basen und Salze mittelst einfacher metallischer Leiter und einer einfachen Ladungssaeule mit trennbaren einpoligen Elementen.* 15 pp. 4to. *Munich, 1823*  
The magnetic effect of the electric current.

809. **Biot**, J(ean) B(aptiste). (1774-1862.) *Précis élémentaire de physique expérimentale.* Troisième édition. 2 vols. 18 plates. 8vo. *Paris, 1824*  
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—See also 633.

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Critical history of electro-magnetism to which the author adds some experiments of his own.  
—See also 1083.

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814. **Description** d'un appareil électro-dynamique, construit par M. Ampère. 24 pp. 1 plate. 8vo. *Paris, 1824*  
Ampère's table; paper on electromagnetic reactions.

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The article contains biographical and critical foot-notes.

816. **Hulde aan de nagedachtenis van Jean Henri van Swinden.** x+122 pp. portr. 8vo. *Amsterdam, 1824*  
The first part is a panegyric of the author and the second a eulogy in verse. These are followed by a list of van Swinden's works.

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Metaphysical rather than physical treatment of the subject.

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Distribution of current in a linear conductor.  
—See also 824, 902, 957, 976, 996, 1251, 1450, 1670, 1767, 1794, 1827, 2627.

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—See also 429.

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Dictionary of physical terms.

821. **Jackson**. Substance of twelve lectures on select subjects in natural philosophy, intended to illustrate the present state of science. xviii+444 pp. 1 plate. 12mo. *London, 1825*  
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*Paris, 1825*  
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—See also 1105.

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General magazine review of the above-named works; Gilbert's *De magnete* (see No. 72), Norman's *New Attractive* (see No. 66), work of Hansteen, Biot and Barlow.  
—See also 718, 720.

824. **De la Rive**, A(uguste Arthur). (1801-1873.) Recherches sur une propriété particulière des conducteurs métalliques de l'électricité. (Mém. Soc. Phys. et d'Hist. Nat., Vol. 3, pp. 201-216) 4to.  
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—See also 818.

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—See also 1145, 2640.

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—See also 790.

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and additions comprehending the latest discoveries and improvements. viii+291 pp. 7 plates. 8vo. Cambridge, 1827

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—See also 634.

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832. **Le Baillif, (Alexandre C. M.)** (1764-1831.) Notice sur la construction du sideroscope. (Bull. Sc. Math., Phys. et Chim., Vol. 8, pp. 87-95) 8vo. Paris, 1827

Diamagnetic repulsion of bismuth, p. 6. The author recognized in 1827 the diamagnetic property of antimony.

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*Latimer Clark*  
1867.

# AN ESSAY

ON THE

*APPLICATION*

OF

MATHEMATICAL ANALYSIS TO THE THEORIES OF  
ELECTRICITY AND MAGNETISM.

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BY

GEORGE GREEN.

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*London, 1841*

835b. — — (French edition.) Théorie mathématique des courants électriques. Traduction, préface et notes de J. M. Gaugain. 202 pp. 8vo.  
*Paris, 1860*  
The translation is preceded by a critical preface and by a sketch of the author's life; also valuable notes by the translator, himself a distinguished electrician.

835<sup>1</sup>c. — — (Reprint of Francis translation.) 269 pp. 16mo.  
*New York, 1891*  
This reprint is accompanied by a preface and notes by Mr. Thomas D. Lockwood.  
—See also 1266.

836. Pfaff, J(ohann) W(ilhelm Andreas.) (1774-1835.) Die Umkehrung der voltaischen Pole durch Herrn Pohl, oder die durch seine Philosophie geheilte 25jaehrige Blindheit der Naturforscher. 138 pp. 8vo.  
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—See also 801.

838<sup>1</sup>bis. Ampère, (André Marie.) (1775-1836.) Note sur l'action mutuelle d'un aimant et d'un conducteur voltaïque. (Extract, Ann. Chem. Phys., 1828.) 29 pp., 1 plate. 8vo.  
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Recently discovered electro-magnetic phenomena; effect of solar rays on magnets, observations of Prof. Morichini, Mrs. (Mary Fairfax) Somerville and Mr. Christie, p. 23.

847a.—Second edition, revised. 76 pp. ill. 12mo. *London, 1856*  
—See also 2678.

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849. **Fechner**, Gustav Theodor. (1801-1887.) Lehrbuch des Galvanismus und der Elektrochemie. xvi+564 pp. 2 plates. 8vo.  
*Leipzig, 1829*  
 Textbook of current electricity. (Vol. III. of Biot's *Lehrbuch der Experimental Physik*.)  
 —See also 859, 865, 892.

850. **Muncke**, G(eorg) W(ilhelm). (1772-1847.) Handbuch der Naturlehre. 2 vols. 8vo.  
*Heidelberg, 1829-1830*  
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856a.— —Nouveau manuel complet de l'électricité atmosphérique. Translated by A(natole) Riffault. (Manuels-Roret.) vi+264 pp. 3 plates. 16mo.  
*Paris, (1874)*  
 Treatise on atmospheric electricity to which are added notes on dew, hail and lightning-rods.  
 —See also 88o.

857. **Perrot**, A. M. (1795-?). La conquête d'Alger; ou Relation de la Campagne d'Afrique, comprenant les motifs de la guerre, les détails des préparatifs de l'expédition et des événements qui ont précédé le débarquement, la composition de l'armée de terre et de l'armée navale, les noms des officiers supérieurs et

dant pas un mot à la question , la jugèrent comme auraient fait les juges du quinzième siècle, et condamnèrent M. de Vissery à démolir la flèche malencontreuse. M. de Vissery ne se tint pas pour battu ; il vint me consulter, et je l'engageai fortement à se pourvoir , par appel , pour faire réformer ce ridicule jugement. Je fus chargé de le défendre devant le conseil supérieur. Comme il s'agissait d'une thèse qui occupait alors tous les esprits , je voulus appeler sur la cause l'attention publique , persuadé que mes juges hésiteraient à heurter de front l'opinion qui commençait déjà à être une puissance , quelque velleité qu'ils éprouvassent de suivre l'ornière de la routine. Je publiai un mémoire que je fis répandre avec profusion à Arras et à Paris. J'y traitai la question légale ; mais surtout , ce qui était une innovation dans notre barreau de province , je m'occupai de la question physique que j'examinai sous toutes ses faces. Mon mémoire fut goûté et me valut des lettres flatteuses de la part des hommes les plus distingués dans les sciences. Dès-lors ma cause fut gagnée , et le succès de l'audience me devint facile. Par son arrêt du 31 mai 1783 , la Cour réforma le jugement des échevins de Saint-Omer, et permit à M. de Vissery de rétablir son paratonnerre.

Cette affaire acheva ma réputation , et l'étendit même hors des limites de ma ville natale ; le car-

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un précis des operations militaires, d'après les documents officiels et particuliers, recueillis et mis en ordre par A. M. Perrot. vii+145 pp. maps. 8vo. *Paris, 1830*

Account of the conquest of Algiers by the French in 1820.

858. **Robespierre**, Maximilien (Marie Isidore de.) (1758-1794.) Mémoires authentiques. 2 vols. portr. 12mo. *Brussels, 1830*  
Interesting defense Vol. 1, p. 167, of the lightning-rod by the French revolutionist. When a young lawyer he successfully defended a client who had been prosecuted for erecting a lightning-rod on his house, the charge being that the act was irreligious. The University of Pennsylvania has a letter from Robespierre to Franklin transmitting a copy of the plea. While apocryphal, this work (written by C. Reybaud) is reliable in its statements.

859. **Fechner**, Gustav Theodor. (1801-1887.) Massbestimmungen ueber die galvanische Kette. xii+260 pp. 1 plate. 8vo. *Leipzig, 1831*  
Inquiry into the nature and measurement of the electric current with numerous examples.  
—See also 849.

860. **Hansteen**, (Christopher.) (1784-1873.) Ueber die magnetische Intensitaet der Erde. (Astronomische Nachrichten, Vol. 9, pp. 303-315) 1 map. 4to. *Altona, 1831*  
Short paper on the magnetic intensity of the earth with remarks on methods of determining it, accompanied by chart of isodynamic lines.  
—See also 756.

861. **Paris**, John Ayrton. (1785-1856.) Life of Sir Humphry Davy. xv+547 pp. portr. 4to. *London, 1831*  
Account of Davy's Bakerian lectures and electrical work.

862. **Riess**, P(eter) Th(epophil). (1804-1883.) De telluris magnetismi mutationibus et diurnis et mensuris. 62 pp. 1 plate. 4to. (Inaugural dissertation.) *Berlin, 1831*  
This thesis discusses the daily and monthly variations of the earth's total (magnetic) force and seeks to determine the cause.  
—See also 1130, 1783, 2000, 2168, 3250.

863. **West**, Francis. (1810-1868.) The electrician's guide; being a brief outline of the science of electricity. 38 pp. 2 plates. 16mo. *London, 1831*  
Note on the progress of medical electricity.

864. **Belli**, Giuseppe. (1791-1860.) Riflessioni sulla legge dell'attrazione molecolare. 23 pp. 4to. *Padova, 1832*  
The laws of molecular not the same as that of molar attraction; Laplace criticized.  
—See also 899, 916, 3049.

865. **Fechner**, Gustav Theodor. (1801-1887.) Repertorium der Experimentalphysik enthaltend eine Zusammenstellung der neueren Fortschritte dieser Wissenschaft. (Als Supplement zu neueren Lehr- und Woerterbuechern der Physik.) 3 vols. 10 plätes. 8vo. *Leipzig, 1832*  
Extensive treatment of electricity and magnetism with bibliography of the subject.  
—See also 849.



867. GAUSS. (See No. 4377.)

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866. **Julia-Fontenelle**, Jean Sébastien Eugène de. (1790-1842.) *Manuel de physique amusante; ou nouvelles récréations physiques.* 4. edition. 460 pp. pl. 16mo. *Paris, 1832*  
Recreational experiments in physics.

867. **Gauss**, Karl Friedrich. (1777-1855.) *Intensitas vis magneticae terrestris ad mensuram absolutam revocata.* (Comment. Soc. Sc. Goettingen, Vol. 8, pp. 3-44) 4to. *Gottingen, 1832*  
Classical memoir on the measurement of magnetic force; a translation will be found in Taylor's *Scientific Memoirs*.  
—See also 905, 920.

868. **La Beaume**, (Michael.) *On the portable sudatory; or Hot-air-baths; with cases illustrative of its medical powers in various disorders, and its great utility in cholera morbus, with directions for its administration, together with remarks on the applicability of galvanism in the first stage of that disease.* Second edition. 84 pp. 1 plate. 12mo. *London, 1832*  
Galvanism, "an elixer of life."  
—See also 747.

869. **Majocchi**, (Giovanni Alessandro.) (?-1854.) *Sulle correnti magneto-elettriche e sulla calamita elettrica, lettera scritta al Prof. Cav. Carlini.* 19 pp. 1 plate. 8vo. *Milan, 1832*  
Remarks on Faraday's discovery of magneto-electric currents.

870. **Pollock**, Thomas. *Attempt to explain the phenomena of heat, electricity, galvanism, magnetism, gravitation and light on the assumption of one cause, or universal principle.* xi+158 pp. 8vo. *London, 1832*  
"Electricity is defined as the effect of the accumulation of the universal principle on the surfaces of bodies, or its abstraction from them."  
—See also 1181, 2731.

871. **Roget**, P(eter) M(ark.) (1779-1869.) *Treatises on electricity, galvanism and electro-magnetism.* vii+64+32+96+99 pp. ill. 8vo. *London, 1832*  
Local attraction, p. 61; magnetic intensity at different heights from ground, p. 87; magnetic influence of light, p. 97. By the author of the well-known Roget's *Thesaurus*.  
—See also 873, 2611.

872. **Schelling**, Fr(iedrich) W(ilhelm) J(oseph) von. (1775-1854.) *Ueber Faraday's neueste Entdeckung.* 31 pp. 8vo. *Munich, 1832*  
Discourse on Faraday's discovery of magneto-electricity.

873. **Natural philosophy**, with an explanation of scientific terms, and index. (Library of Useful Knowledge, Vol. 2). lxiv+528 pp. ill. pl. 8vo. *London, 1832*  
The parts on electricity and magnetism (Sections 5-8), were written by Dr. Peter Mark Roget.  
—See also 871.

874. **The Spectator**. xiv+918 pp. pl. 8vo. (Reprint, 1711.) *London, 1832*  
Strada's sympathetic needles and allusion to magnetic telegraphy, p. 345.  
(See No. 90.)

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874a.——2 pp. (MS. copy of the article on Strada's needles.) Folio.  
*London, 1877*

875. **Gorton, John.** ( ? -1835.) General biographical dictionary. 3 vols. 8vo.  
*London, 1833*  
 Short sketches of noted electricians.

876. **Lardner, Dionysius.** (1793-1859.) Treatise on heat. (The Cabinet Encyclopaedia) viii+429 pp. 12mo.  
*London, 1833*  
 Electrification, a source of heat, p. 382.  
 —See also 1062, 1236, 1286, 1323, 1395, 1681, 1915.

877. **Lenz, (Heinrich) F(riedrich) E(mil).** (1804-1865.) Ueber die Leitungsfaehigkeit der Metalle fuer die Elektricitat bei verschiedenen Temperaturen. (Mém. Acad. Sc. Ser. II., Vol. 2, pp. 631-656.) 4to.  
*St. Petersburg, 1833*  
 Variation of electric conductivity with temperature.  
 —See also 937.

878. **Metcalf, Samuel L. (also Metcalfe).** (1798-1856.) New theory of terrestrial magnetism. (Read before The New York Lyceum of Natural History.) 158 pp. 8vo.  
*New York, 1833*  
 The theory is that "Caloric" is the cause of atmospheric electricity, gravitation, magnetic polarity etc.

879. **Murphy, R(obert).** (1806-1843.) Elementary principles of the theories of electricity, heat and molecular actions. Part 1. On electricity. vi+145 pp. 8vo.  
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 Mathematical treatment of some phenomena in static and dynamic electricity.

880. **Murray, John.** (1786?-1851.) Description of a new lightning conductor and observations on the phenomena of the thunder-storm. 63 pp. 1 plate. 8vo.  
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 Classification of storms; effects of lightning, p. 22; ships struck, p. 43.  
 See also 856.

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 Twenty pages on the elements of static and current electricity.

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*Paris, 1834-1840*  
 Comprehensive treatise on electricity and magnetism, theoretical, practical and historical. Vol. 1 deals with the history of the subject; Vol. VI, Part 2, is devoted to terrestrial magnetism. The first thorough treatise on modern electricity.  
 —See also 1093, 1112, 1310, 1406, 2564.

883. **Cunningham, P(eter).** On the motions of the earth and heavenly bodies as explainable by electro-magnetic attraction and repulsion and on the conception, growth, and decay of man, and cause and treatment of his diseases, as referable to galvanic action. xii+iii+281 pp. 8vo.  
*London, 1834*  
 An effort is made to explain the motion of the heavenly bodies on the supposition that they consist of electro-magnetic matter; magnetic action of ultra-violet light, p. 3.

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884. **Enschede**, Wilhelm Adrian. *De calore qui excitatur electricitate quam annuente summo numine.* (Inaugural dissertation) 77 pp. 4to. Thesis on the heat due to electric discharge. *Leyden, 1834*

885. **Higgins**, W(illiam) Mullinger. *Alphabet of electricity for the use of beginners.* viii+116 pp. ill. 12mo. *London, 1834*  
Interesting from its historical references. The author neglects electromagnetism, the work of Oersted, Arago and Faraday receiving no notice.  
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Important contribution to the history of the magnetic compass on land and sea.

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Researches on electrical phenomena.  
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Bibliography of the telegraph; electric telegraph for railroad purposes.

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No reference to electricity or magnetism.

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—See also 2613.

891. **Barlow**, James. *A new theory, accounting for the dip of the magnetic needle, being an analysis of terrestrial magnetism, with a solution of the lines of variation and no variation, and an explanation of the nature of a magnet.* xxvii+183 pp. 1 map, 1 plate. 8vo. *New York, 1835*  
The theory here advanced is that "caloric" is the cause of polarity.

892. **Fechner**, Gustav Theodor. (1801-1887.) *De nova methodo magnetismum explorandi, qui per actionem galvanicam in ferro ductili excitatur.* (Inaugural dissertation) 25 pp. 4to. *Leipzig, 1835*  
Magnetism induced in needles by the passage of a current through a surrounding coil.

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893.——De variis intensitatem vis galvanicae metiendi methodis. (Inaugural dissertation.) 32 pp. 4to. *Leipzig, 1835*  
The three methods given for measuring magnetic force are by deflection, torsion, and oscillation.  
—See also 849.

894. **Gherardi, Silvestro.** (1802-1879.) De quadam appendice ad galvanometrum multiplicans, et de ejus usu in profluviis variis ac praecipue Faradayis expendendis. (Extract, *Act. Acad. Scient. Instit. Bonon.* Vol. 3) 42 pp. 4to. *Bologna, 1835*  
Dissertation on the use of the galvanometer for comparison of currents of various origin i. e. thermo-electric, voltaic, magneto-electric.  
—See also 929, 1571, 1595, 1720, 1742, 1798, 1831, 1865, 1976, 3130.

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The electrical work of Aepinus, Coulomb and Poisson. Fourier's differential equation; also critical remarks on the "fluid" theory of electricity.  
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Note on the electric properties of pointed conductors.  
—See also 864.

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One chapter of 100 pages by the eminent chemist on general electrical phenomena.  
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 Work on general physics, especially electricity and magnetism.  
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 Work on general physics written while the author was Professor in the Polytechnische Schule, Karlsruhe.

904a.—Third edition. vi+664 pp. 10 plates. 8vo. *Mannheim, 1841*  
 —See also 1672.

905. **Gauss**, (Karl Friedrich.) (1777-1855.) *Erdmagnetismus und Magnetometer.* (Schumacher's Jahrbuch, 1836, pp. 1-47) 12mo. *Stuttgart, 1836*  
 On terrestrial magnetism.  
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 "Heat, light and electricity are all concomitant products of electro-chemical reaction," p. 11. The author was a distinguished American chemist.  
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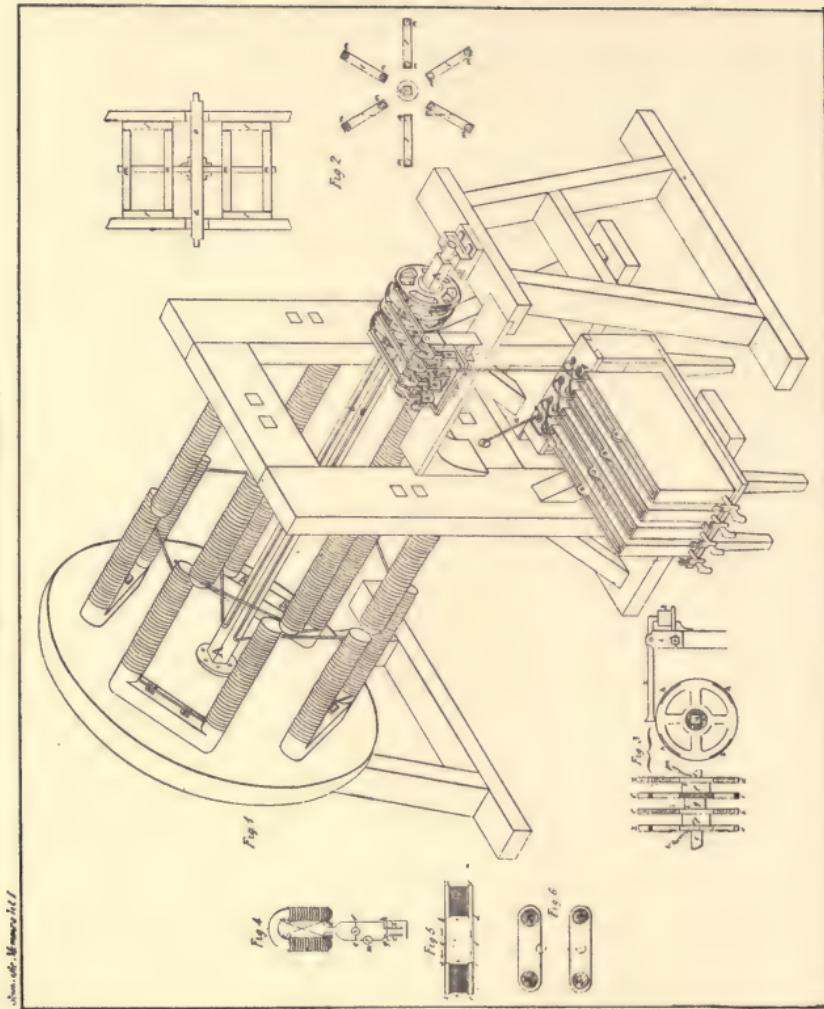
907. **Jacobi**, M(oritz) H(ermann) von. (1801-1874.) On the application of electro-magnetism to the movement of machines. (? pp. 503-554) 1 plate. 8vo. *(London, 1836?)*  
 Jacobi's electromagnetic motor with diagrams; paper of historic interest.

907a.—(French translation.) (Biblioth. Univers. [Suppl.] Genève, N. S. Vol. 47, pp. 233-344.) 8vo. *Geneva, 1843*  
 —See also 933, 938, 982, 1046, 1362, 1394, 1837.

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 In the preface will be found a metrical composition of the XII<sup>th</sup> century on the mariner's compass.

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 —See also 1908, 3469.

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 Dissertation on the theory of the voltaic cell.  
 —See also 3202.

914. Weber, Eduard (Friedrich.) (1806-1871.) *Quaestiones physiologicae de phenomenis galvano-magneticis in corpore humano observatis.* 26 pp. 4to. (Inaugural dissertation.) *Halle, 1836*  
 The electric resistance of the human body and kindred subjects.

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 This is the author's celebrated monograph on lightning and thunder.  
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933. JACOBI. (See No. 4377.)

937. **Lenz**, (Heinrich Friedrich) E(mil.) (1804-1865.) Ueber das Gesetz der Leitungsfähigkeit fuer Elektricität bei Drahten von verschiedenen Längen und Durchmessern. (Mém. Acad. Sc. St. Petersbourg, Ser. II., Vol. 3, pp. 187-204) 4to.  
*St. Petersburg, 1838*  
 Variation of resistance of electric conductors with length and cross-section.  
 —See also 877.

938. **Lenz**, (Heinrich Friedrich) E(mil) (1804-1865) & (Moritz Hermann) von **Jacobi**. (1801-1874.) Ueber die Gesetze der Elektromagnete. (Bull. Acad. Sc. St. Petersbourg, Ser. II., Vol. 4, pp. 337-367; Vol. 5, pp. 257-272.) 8vo.  
*St. Petersburg, 1838-1839*  
 The magnetism produced in a bar of soft iron varies as the current strength and number of turns in the magnetizing helix.  
 —See also 877, 907.

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 Learned work containing references to the mariner's compass, Vol. 1, p. 136, Vol. II, p. 62; also text of the famous letter of Petrus Peregrinus on the magnet from the MS. in the Bibliothèque National, Paris. (See No. 46.)

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 —See also 1078.

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 Magnetic theory discussed.  
 —See also 1078bis, 1287, 1575, 2938.

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*Berlin, 1838*  
 The three magnetic elements.  
 —See also 2696.

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 —See also 887.

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 Beginning of a dynamical theory of the voltaic current. (Autograph copy, dedicated to Faraday).  
 —See also 966, 987, 1026, 2684.

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—See also 1166.

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—See also 1469, 1676, 3421.

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# EXPERIMENTAL RESEARCHES

IN

## ELECTRICITY.

BY

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Davy anticipated Ohm, p. 379; magnetic chart for 1829.

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—See also 3267.

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—See also 570.

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*London, 1842*  
Suggestive, experimental handbook. Has been cited in transformer litigation owing to the treatment in detail of the Ruhmkorff coil.

**1012a.**—Second edition. viii+322 pp. ill. 12mo. *Boston, 1848*

**1012b.**—Seventh edition. viii+322 pp. ill. 8vo. *Boston, 1855*  
—See also 5510.

**1013.** **Dellmann**, (Johann) F(riedrich Georg.) (1805-1870.) Ueber ein neues Elektrometer. 24 pp. 4to.  
*Coblentz, 1842*  
The author's electrometer and its uses.  
—See also 1512.

**1014.** **Dempp**, Karl Wilhelm. Vollstaendiger Unterricht in der Technik der Blitzableitersetzung nach 66 Modellen, nebst einem vorbereiteten Auszuge der Elektricitätslehre und geschichtliche Notizen ueber die Erfindung und Einfuehrung der Blitzableiter. Fuer Architekten, Ingenieure, Bau- und Werkmeister, etc. vi+110 pp. 3 plates. 8vo.  
*Munich, 1842*  
The erection of lightning-conductors; written as a guide for architects.

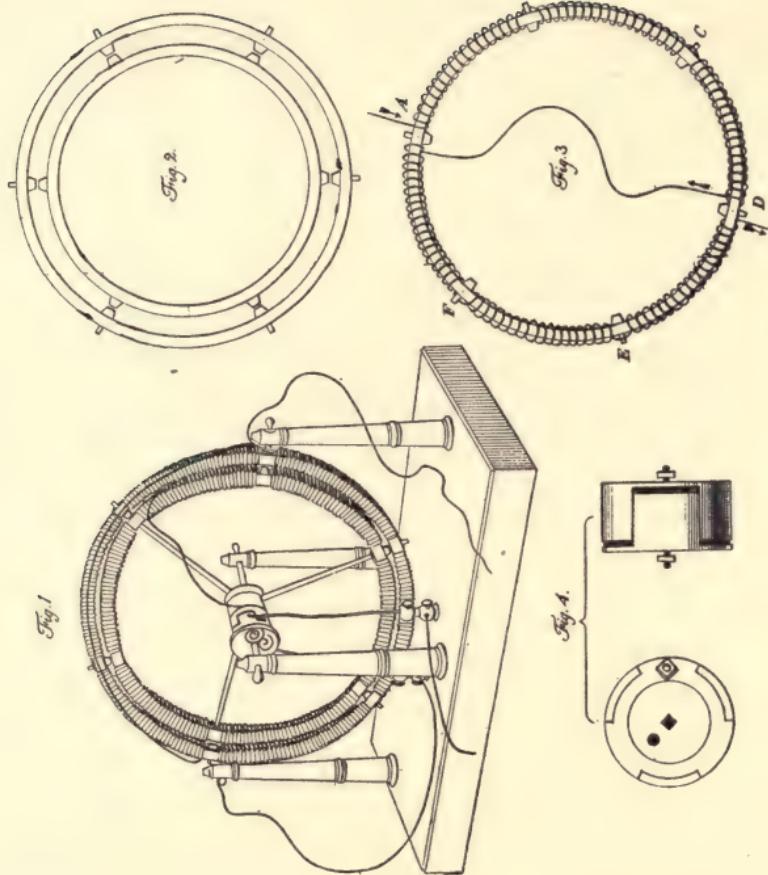
**1015.** **Elias**, P. (1809-1878.) Beschrijving eener nieuwe machine ter aanwending van het electro-magnetismus als bewegkracht. 40 pp. 1 plate. 8vo.  
*Harlem, 1842*  
The electro-motor invented by Elias of Amsterdam in 1842 marks an era in the practical application of electricity. See Sturgeon's "Annals" and Dredge's *Electric Illumination*. (See No. 2276.)  
—See also 1517.

**1016.** **Friese**, Robert. Theoria galvanismi. 80 pp. 8vo. (Inaugural dissertation.)  
*Bonn, 1842*  
Dissertation on the general phenomena of currents.

**1017.** **Grove**, (Sir) W(illiam) R(obert.) (1811-1896.) Lecture on the progress of physical science since the opening of the London Institution. 46 pp. 8vo.  
*London, 1842*  
Review of the work of Oersted, Ohm and Seebeck.  
—See also 1096, 2802.

**1018.** **Hansteen**, Ch(ristopher.) (1784-1873.) Disquisitiones de mutationibus quas patitur momentum acus magneticæ. 44 pp. 1 plate. 4to. (Programm.)  
*Christiania, 1842*  
Experimental study of the weakening of the magnetic moment of magnets.  
—See also 756.

**1019.\*** **Harris**, (Sir) W(illiam) Snow. (1792-1867.) Protection from lightning. (Extract, *Nautical Mag.* 1842) 10 pp. 12mo.  
*London, 1842*  
Instances of damage done to men-of-war by lightning; advocacy of the method of protection devised by the author.  
—See also 801.



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1020. **Knobloch, M.** Der Galvanismus in seiner technischen Anwendung seit 1840. 116 pp. 8vo. Erlangen, 1842  
Some practical applications of the electric current.

1021. **Kobell, (Wolfgang Xaver) Franz von.** (1803-1882.) Die Galvanographie, eine Methode gemalte Tuschbilder durch galvanische Kupferplatten im Drucke zu vervielfaeltigen. 18 pp. 7 plates. 4to. Munich, 1842  
Galvanography, or the art of reproducing pictures by means of the electric current. (See No. 986.)

1022. **Kopp, E(mil).** (1817-1875.) Essai sur les causes des variations de l'intensité des courants galvaniques. 59 pp. 4to. (Thèse.) Strasburg, 1842  
Current strength as affected by the arrangement of the cells in the battery, joint resistance of the conductors in circuit, etc.

1023. **Lloyd, Humphrey.** (1800-1881.) On a new magnetical instrument for the measurement of the inclination and its changes. 16 pp. 8vo. Dublin, 1842  
—See also 1420, 1916, 2035, 2710.

1024. **Marianini, Stefano Giovanni.** (1790-1866.) Memoria sopra la corrente che nasce in un filo metallico chiuso quando si sospende la corrente voltaica che passa vicina e parallela ad esso. Letta alla R. Accad. di Modena, 5 Agosto 1841. (Raccolta fis.—chim. ital., Vol. 2, pp. 249-255.) 4to. Modena, 1842  
Some phenomena of current induction.  
—See also 1063, 3241.

1025. **Matteucci, C(arlo).** (1811-1868.) Observations sur un mémoire de M. Vorsselman de Heer, relatif à des expériences thermoélectriques. (Biblioth. Univers. Suppl. Arch. l'Électricité, Vol. 2, pp. 227-230) 8vo. Geneva, 1842  
—See also 985.

1026. **Peltier, J(ean) C(harles) A(thanase.)** (1785-1845.) Recherches sur la cause des phénomènes électriques de l'atmosphère, et sur les moyens d'en recueillir la manifestation. 49 pp. 1 plate. 8vo. Paris, 1842  
Presence and effect of water-vapor in the atmosphere; causes of the electrification of the atmosphere; clouds positively and negatively charged.  
—See also 944.

1027. **Poggendorff, J(ohann) C(hristian.)** (1796-1877.) Méthode pour déterminer la force électromotrice dans les courants voltaïques à force non constante. (From Ann. Phys. Chem. Vol. 54) (Biblioth. Univers. Suppl. Arch. l'Électricité, Vol. 2, pp. 5-35.) 8vo. Geneva, 1842

1027a.—Méthode pour déterminer le rapport entre le maximum d'intensité de deux courants voltaïques. (From Ann. Phys. Chem. Vol. 54.) (Biblioth. Univers. Suppl. Arch. l'Électricité, Vol. 2, pp. 196-221) 8vo. Geneva, 1842  
—See also 1103, 1333, 1691, 1752, 1781, 1950, 2782.

1028. **Sampson, Thomas.** Electrotint; or, The art of making paintings in such a manner that copper plates and blocks can be

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taken from them by means of voltaic electricity. 26 pp. 3 plates. 8vo. *London, 1842*  
 Producing drawings or paintings so that copper plates for printing can be made from them by the electrotype process. (See No. 4995.)

1029. Shaw, George. (1751-1813.) Manual of electro-metallurgy. vi+49 pp. 8vo. *London, 1842*

1029a.—Second edition, enlarged. iv+202 pp. pl. 8vo. *London, 1844*

1030. Smee, Alfred. (1818-1877.) New definition of the voltaic circuit. (Reprinted from "Elements of electro-metallurgy," pp. 187-204) 19 pp. 8vo. *London, 1842*  
 Daniell, Grove and Smee cells considered. (Autograph copy.)

1031.—On the intimate rationale of the voltaic force. (Reprinted from "Elements of electro-metallurgy," pp. 307-328) 22 pp. 8vo. *London, 1842*  
 Electricity is not a *thing*, it is a *vibration*.  
 —See also 1006.

1032. Sturgeon, William. (1783-1850.) Lectures on electricity, delivered in the Royal Victoria Gallery, Manchester during the years 1841-1842. xi+240 pp. 1 plate. 12mo. *London, 1842*  
 Comprehensive popular treatment by the notable English electrician.  
 —See also 925.

1033. Wartmann, Elie (François.) (1817-1886.) *Sur les relations qui lient la lumière à l'électricité, lorsque l'un des deux fluides produit une action chimique.* (Biblioth. Univers. Suppl. Vol. 2, Arch. d'Électricité, pp. 596-600.) 8vo. *Geneva, 1842*  
 The question is asked: "Is light converted into electricity?" (Autograph copy, dedicated to Faraday).  
 —See also 1088, 1138, 2889.

1034. Wetzler, J(ohann) E(vangelist.) (1774-?) Beobachtungen ueber den Nutzen und Gebrauch des Keil'schen magnet-elektrischen Rotations-Apparatus in Krankheiten, besonders in chronisch-nervösen, rheumatischen und gichtischen, gesammelt zu Muenchen, Augsburg, Wuerzburg und Kissingen. 184 pp. 8vo. *Leipzig, 1842*  
 Instances from the author's practise of the effective application of the electric current to the cure of diseases.

1035. Arrott, Alexander R. On some new cases of voltaic action, and on the construction of a battery without the use of oxidisable metals. (Mem. Chem. Soc. Vol. 1, pp. 142-150) 8vo. *London, 1843*  
 The conclusion of the paper is that chemical action is the result of the tendency of the molecules of the electrolyte to arrange themselves in a state of equilibrium.

1036. Boquillon, (Nicolas.) *De l'électrotypie.* (Extract, Revue Scient. Indust.) 58 pp. 8vo. *Paris, 1843*  
 Account of the author's researches on electrotyping with allusions to the work of Jacobi, Spencer and others. (See Nos. 982, 990.)

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1037. **Botto**, (Giuseppe Domenico). (1791-1865.) Expériences sur les rapports entre l'induction électro-magnétique et l'action électro-chimique suivies de considérations sur les machines électro-magnétiques. (Mem. Accad. Sc. Torino, Ser. II., Vol. 5, pp. 239-261) 4to. *Turin, 1843*  
 Comparison of the electrochemical and electromagnetic effects of a Grove battery.  
 —See also 951.

1038. **Braid**, James. (1795?-1860.) Neurypnology; or, The rationale of nervous sleep, considered in relation with animal magnetism. Illustrated by cases of its application in the relief and cure of disease. xii+265 pp. 12mo. *London, 1843*  
 Hypnotism with a few allusions to personal magnetism. The writer was a pioneer of the modern school of hypnotism.

1039. **Eydam**, I(mmanuel.) (1802-1847.) Die Erscheinungen der Elektrizitaet und des Magnetismus in ihrer Verbindung mit einander. Nach den neuesten Entdeckungen im Gebiete des Elektro-Magnetismus und der Induktions-Elektrizitaet fuer Freunde der Naturwissenschaften und besonders fuer Aerzte ausfuehrlich dargestellt. xx+360 pp. 3 plates. 8vo.  
*Weimar, 1843*  
 Magnetism and electricity compared with regard to their nature and effects.

1040. **Finlaison**, John. (1783-1860.) Account of some remarkable applications of the electric fluid to the useful arts by Mr. Alexander Bain; with a vindication of his claim to be the first inventor of the electro-magnetic printing telegraph, and also of the electro-magnetic clock. 127 pp. 2 plates. 8vo.  
*London, 1843*  
 The first two parts of a controversial character; part III. notices the earlier applications of electro-magnetism and is followed by a chronological table extending from 1816 to 1843. Also newspaper article on Bain, by Professor Tait. (See No. 995.)

1041. **Frocheur**, Florian. Brunetto Latini; notice sur un manuscrit français de son Trésor des sciences. 23 pp. 1 plate. 8vo.  
*Brussels, 1843*  
 Account of the works of Brunetto Latini, poet and philosopher who died in 1294. Reference to the mariner's compass, p. 20.

1042. **Gavarret**, (Louis Dominique Jules.) (1809-1890.) Lois générales de l'électricité dynamique, analyse et discussion des principaux phénomènes physiologiques et pathologiques qui s'y rapportent. 151 pp. 4to. (Thèse.) *Paris, 1843*  
 Thesis in which the sources and effects of dynamic electricity are discussed; electric fishes, muscular currents, electro-therapeutics.  
 —See also 1390, 1519.

1043. **Harris**, (Sir) William Snow. (1792-1867.) On the nature of thunderstorms and on the means of protecting buildings and

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shipping against the destructive effects of lightning. xvi+226 pp. ill. 8 plates. 8vo. *London, 1843*

This work contributed greatly to the adoption in England of lightning conductors for the protection of houses and ships; besides the 8 plates, there are 52 illustrations.

—See also 801.

1044. **Hesse**, Julius (Ostwald.) *Erfahrungen und Beobachtungen ueber die Anwendung des magneto-elektrischen Rotations-Apparates bei verschiedenen Krankheiten.* iv+95 pp. 12mo. *New-Brandenburg, 1843*

Magneto-electric machine for medical purposes.

1045. **Humphreys**, John Doddridge. *Electro-physiology of man.* With practical illustrations of new and efficient modes of galvanic treatment in a variety of cases. xii+228 pp. 12mo. *London, 1843*

General principles of physiology followed by an account of the part played by electricity in the treatment of disease.

1046. **Jacobi**, Moritz Hermann von. (1801-1874.) *Bericht ueber die Entwicklung der Galvanoplastik.* (Bull. Acad. Sc. Cl. Physico-Math. St. Petersbourg, Vol. I., pp. 65-71.) 8vo. *St. Petersburg, 1843*

Two papers on electrotyping processes, 1842.

1047.——*Bericht ueber die galvanische Vergoldung.* (Bull. Acad. Sc. Cl. Physico-Math., Vol. I, pp. 72-78.) 8vo. *St. Petersburg, 1843*

Paper of historical interest on goldplating.

1048.——*Extrait d'une lettre de M. le Prof. Jacobi à Dorpat à M. Lenz.* (Article written in German.) (Biblioth. Univers. Suppl. Arch. l'Electricité, Vol. 3.) 7 pp. 1 plate. 8vo. *Geneva, (1843)*

Research connected with Daniell's battery.

—See also 907.

1049. **Lamont**, (Johann) von. (1805-1879.) *Bestimmung der Horizontal-Intensitaet des Erdmagnetismus nach absolutem Maase.* (Abh. Bayer. Akad. Wiss. Math.-Nat. Kl. Vol. 3, pp. 621-670+1 p. additions in MS.) 1 plate. 4to. *Munich, 1843*

Theory of the method of determining the horizontal component of the earth's magnetism in absolute measure.

—See also 1208, 1364, 1491, 1679, 2803.

1050. **Sabine**, (Sir) Edward. (1788-1883.) *Observations on days of unusual magnetic disturbance, made at the British Colonial Magnetic observatories.* Part I. 1840-1841. Folio. *London, 1843*

The observations tabulated at Toronto, St. Helena, Van Diemen's Land and the Cape of Good Hope. Some details about aurorae.

—See also 945.

1051. **Schoenbein**, C(hristian) F(riedrich). (1799-1868.) *Sur la nature d'odeur particulière qui se développe au pôle positif d'une pile pendant l'électrolysation de l'eau, et qui se dégage par les*

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pointes, pendant l'émission de l'électricité ordinaire. (Biblioth. Univers. Suppl. Arch. l'Électricité, Vol. 3, pp. 295-308.) 8vo.

Geneva, 1843

On the odor produced at the anode during electrolysis of water, and between pointes during electric discharge; ozone.

—See also 989.

1052. (Sidney, Edwin.) Electricity, its phenomena, laws and results. viii+184 pp. ill. Sm. 4to.

London, 1843

Popular exposition with numerous illustrations.

1052a.—New edition. vii+182 pp. 16mo.

London, (1862)

1053. Sloet tot Oldhuis, B(artholomeus) W(illem) A(nne) E(lisa.) (1808-1844.) Levenschets van P. O. C. Vorsselman de Heer met bijlagen van de hoogleeraren J. F. L. Schroeder, G. J. Mulder en den heer S. van Delden. 208 pp. portr. 8vo.

Deventer, 1843

Life of Vorsselman de Heer.

1054. Sturgeon, William. (1783-1850.) Course of twelve elementary lectures on galvanism. xi+231 pp. ill. 1 plate. 12mo.

London, 1843

The appendix contains a detailed account of electrical fishes.

—See also 925.

1055. Zantedeschi, Francesco. (1797-1873.) Le leggi del magnetismo nel filo congiuntivo percorso dalla corrente voltiana. 7 pp. 1 plate. 8vo.

Venice, 1843

Note giving the author's views on the electric current.

1056.—Trattato di fisica elementare. Vol. I. 1 plate. 8vo.

Venice, 1843

Short treatise on general physics.

—See also 950.

1058. Casselmann, W(ilhelm) Th(eodor.) (1820-1872.) Ueber die galvanische Kohlenzinkplatte und einige mit derselben angestellte Beobachtungen. 76 pp. 4 tables, 1 plate. 8vo.

Marburg, 1844

The Bunsen cell.

1059. Elsermann, O. Ueber die Elektricitätsvertheilung in offenen galvanischen Säulen und Ketten sowie in offenen galvanischen Combinationen aus Metallen ohne Dazwischenkunft fluessiger Leiter. 24 pp. 4to. (Programm.)

Saarbruecken, 1844

The voltaic pile, a study.

1060. Grimelli, P. G. Prospetto delle memorie elettriche e magnetiche pubblicate da Stefano Marianini. 86 pp. 1. 8vo.

Modena, 1844

General notice of the principal papers of Marianini.

1061. Hopkins, Evan. (?-1867.) On the connexion of geology with terrestrial magnetism. vi+129 pp. 24 plates. 8vo.

London, 1844

The magnetic and electro-magnetic state of the earth considered.

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1061a.—Third edition. lxxvi pp. 2 plates. 12mo. *London, 1855*  
—See also 1646, 1721.

1062. **Lardner**, Dionysius (1793-1859) and Ch(arles) V(incent) **Walker** (1811-1882). Manual of electricity, magnetism and meteorology. Vol. II., ill. map. 12mo. *London, 1844*  
Comprehensive physical treatment of the subjects.  
—See also 876, 1007.

1063. **Marianini**, S(tefano) Giovanni. (1790-1866.) Memoria sul magnetismo dissimulato e sopra alcuni fenomeni da esso derivanti. (Mem. Soc. Ital. Sc., Modena, Vol. 23, pp. 201-218) 4to.  
*Modena, 1844*  
Magnetic effect of the Leyden jar discharge. Some differences noticed in iron when magnetized by a magnet and by a Leyden jar discharge.  
—See also 1024.

1064. **Matteucci**, C(arlo). (1811-1868.) Traité des phénomènes électrophysiologiques des animaux, suivi d'études anatomiques sur le système nerveux et sur l'organe électrique de la torpille, par Paul Savi. xix+348 pp. 3 plates. 8vo. *Paris, 1844*  
The author's researches on the action of the electric current on the nervous and muscular systems of animals. (See No. 1068.)

1064a.—(English translation.) Lectures on the physical phenomena of human beings, translated by Jonathan Pereira; with corrections and additions by Matteucci and notes by Pereira. x+435 pp. ill. 12mo. *London, 1847*  
—See also 985.

1065. **Noad**, Henry M(inchin). (1815-1877.) Lectures on electricity, comprising galvanism, magnetism, electro-magnetism, magneto- and thermo-electricity. iv+457 pp. ill. 8vo. *London, 1844*  
Enlarged edition of Lectures, first published in 1839. (See No. 1270.)  
—See also 1463, 1688, 1728.

1066. **Petrina**, Franz (Adam). (1799-1855.) Magneto-elektrische Maschine fuer den aerztlichen und physikalischen Gebrauch. 56 pp. 8vo. *Linz, 1844*  
Small magneto-electric machines for physical and medical purposes.  
—See also 1102, 1163, 1268.

1067. **Riddell**, C(harles) J(ames) B(uchanan). (1817-1903.) Magnetical instructions for the use of portable instruments adapted for magnetical surveys and portable observatories and for use of a set of small instruments adapted for a fixed magnetical observatory; with forms for the registry of magnetical and meteorological observations. 146 pp. tables. 4to. *London, 1844*  
Instructions for determining the three magnetic elements at any place.

1067a.—Supplement to magnetical instructions. 22 pp. 4to.  
*London, 1846*

1068. **Savi**, Paolo. (1798-1871.) Etudes anatomiques sur le système nerveux et sur l'organe électrique de la torpille. (Matteucci,

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Traité des phénomènes électro-physiologiques des animaux, pp. 337-348) ill. 8vo. *Paris, 1844*  
Description with illustrations of the electric organ of the torpedo. (See No. 1064.)

1069. **Schellen**, (Thomas Joseph) Heinrich. (1818-1884.) Die elektromagnetische Telegraphie, nebst einer Einleitung ueber optische und akustische Telegraphen. 37 pp. 2 plates. 8vo. (Programm.) *Dusseldorf, 1844*  
Short history of electric telegraphy.  
—See also 1300, 1699, 2170.

1070. **Scoresby**, William. (1789-1857.) Magnetical investigations. 2 vols. 8vo. *London, 1844-1852*  
Vol. I. contains an elaborate series of researches on the capacity and re-tentivity of steel for the magnetic condition. Vol. II. treats of the inductive action of the earth on iron and steel with application to iron ships and their navigation.  
—See also 805.

1071. **Charante**, Nicolaus Hendrik van. (1821-1847.) Disquisitiones quaedam, experimentales et theoreticae circa magnetismum rotatione exercitatum. 80 pp. 1 plate. 1. 8vo. (Inaugural dissertation.) *Leyden, 1844*  
Arago's "rotations" and Faraday's researches.

1072. **Cito**, Michele (also Della Rocca). Esperimenti sulla forza elettrico motrice delle varie sostanze: pubblicati in occasione della settima riunione degli Scienziati Italiani. 11 pp. 8vo. *Naples, 1845*  
Short paper giving results of experiment of the e. m. f. of contact of zinc with a number of liquids.

1073. **Gilliss**, James Melvin. (1811-1865.) Magnetical and meteorological observations made at Washington, 1838-1842. xxviii+648 pp. 8vo. *Washington, 1845*  
Observations of declination at Washington from September 1838 to June 1842.

1074. **Gonon**, Ennemond. Des télégraphes aériens et électriques. 107 pp. 1 plate. 8vo. *Paris, 1845*  
Note on Chappe's semaphoric telegraph, details of the author's system.

1075. **Haldat du Lys**, (Charles Nicolas Alexandre) de. (1770-1852.) Histoire du magnétisme dont les phénomènes sont rendus sensibles par le mouvement. 49 pp. 1 plate. 8vo. *Nancy, 1845*  
History and discussion of "Arago's rotations."  
—See also 979.

1076. **Kaemtz**, L(udwig) F(riedrich.) (1801-1867.) Complete course of meteorology, with notes by Ch. Martins and an appendix containing the graphic representation of the numerical tables by L. Lalanne, translated with notes and additions by C. V. Walker, xxii+598 pp. 15 plates. 8vo. *London, 1845*  
The electrical phenomena of the atmosphere with notes by Charles Vincent Walker.  
—See also 802.

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1077. **Lord**, William. Telegraphic vocabulary, adapted for the line of semaphoric telegraphs from Liverpool to Holyhead, containing also a description of the telegraph and the method of making signals either by the semaphore or Marryat's flags. Sign. a—z, 2a—2c in 4s. 2 plates. 8vo. *London, 1845*

1078. **Magrini**, Luigi. (1804?-1868.) Sulla elettromozione tellurica Sunto di nuovi lavori esperimentali eseguiti dal Prof. L. Magrini in occasione del sesto congresso scientifico, mediante il grande apparato fatto costruire dalla citta di Milano. Il politecnico VII. 69 pp. 8vo. *Milan, 1845*  
Observations and experiments on earth-currents.  
—See also 940.

1078<sup>†</sup>bis. **Masson**, A(ntoine) Phillibert. (1806-1860.) Etudes de photométrie électrique. (Premier et deuxième mémoire, communiqués à l'Académie des Sciences dans les séances des 19 février et 5 août 1844.) (Extrait des Annales de Chimie et de Physique. Ser. III, vol. 14, pp. 1-68, 2 plates.)—Troisième, quatrième et cinquième mémoires. (Extraits des Annales de Chimie et de Physique, Ser. III, vols. 30 and 31, pp. 73-133, 2 plates.) Sixième mémoire. (Extrait d'un travail couronné et publié par la Société Royale des Sciences de Harlem, 1854.) (Extrait des Annales de Chimie et de Physique, Ser. III, vol. 45, pp. 1-70.) 8vo. *Paris, 1845 (-1855)*  
Reprints of six mémoires presented before scientific bodies. Includes a study of the various phenomena of the voltaic arc. Presentation copy of Mr. Delarive, with author's corrections. (See No. 2938.)  
—See also 941.

1078<sup>†</sup>bis. **Magnetic Telegraph** from Baltimore to New York. Report made by Mr. Chappell, March 3, 1845. (Report of Committee of Ways and Means, House of Representatives, 28 Congr., 2nd Sess. Rep. No. 187.) 7 pp. 8vo. *Washington, 1845*  
Under the date of March 3, 1845, the committee after pointing out the merits of Prof. Morse's telegraph, recommends that the government should lose no time "in occupying with a telegraph of its own the ground between Baltimore and New York." The Morse telegraph between Washington and Baltimore was then in operation.

1079. **Palmieri**, Luigi. (1807-1896.) Nuovo apparecchio d'induzione tellurica. 16 pp. 1 plate. 4to. *Naples, 1845*  
General description of an earth-inductor.  
—See also 1750.

1080. **Peltier**, (Jean Charles Athanase.) (fils.) Note sur les phénomènes que peuvent présenter les arbres soumis à l'influence d'un nuage charge d'une puissante tension électrique (Extract, Revue Scient. et industr. 1845.) 7 pp. 8vo. *Paris, 1845*  
The author briefly discusses the effect of the static tension that may arise in the case of poorly-conducting trees influenced by a charged cloud.  
—See also 1101, 1122.

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1081. **Perrot**, (Ingenieur à Rouen.) Lettre sur les procédés électro-chimiques de dorure d'argenture, de zincage, etc. 15 pp. 8vo. *Paris, 1845*  
Electro-deposition: letter on a question of priority.

1082. **Peschel**, C(arl) F(riedrich.) (1793-1852.) Elements of physics, translated from the German with notes by E. West. 3 vols. ill. 12mo. *London, 1845-1846*  
Vol. II has a chapter on magnetism, magnetic effect of violet rays, p. 313.  
Vol. III treats of static and dynamic electricity (elementary).

1083. **Pfaff**, (Christian Heinrich). (1773-1852.) Parallele der chemischen Theorie und der Voltaiischen Contact-Theorie der galvanischen Kette. vii+145 pp. 8vo. *Kiel, 1845*  
Discussion of the contact and chemical theories of the voltaic battery.  
—See also 812.

1084. **Plana**, (Giovanni Antonio Amedeo.) (1781-1864.) Mémoire sur la distribution de l'électricité à la surface de deux sphères conductrices complètement isolées. (Mem. Accad. Sc. Torino, VII, pp. 71-401.) 4to *Turin, 1845*  
Mathematical investigation of the distribution of electric charge on the surfaces of neighboring spheres.  
—See also 1125, 1427.

1085. **Thomson**, (Sir) William. (Lord Kelvin.) (1824-1907.) Note on induced magnetism in a plate. (Cambridge & Dublin Math. Journ. N. S. Vol. I, pp. 34-37.) 8vo. *Cambridge, 1845*  
Mathematical theory of magnetism induced in soft iron.  
—See also 1109, 1134, 1150, 1584, 1656, 1847, 1890, 1967bis, 2052, 2299, 2341, 2378, 2946.

1086. **Ure**, Andrew. (1778-1857.) Recent improvements in arts, manufactures, and mines, being the second edition of a supplement to the third edition, of his dictionary. xvi+311 pp. ill. 8vo. *London, 1845*  
Article on electro-metallurgy, pp. 80-84.

1087. **Vail**, (Alfred). (1807-1859.) Description of the American electro-magnetic telegraph now in operation between the cities of Washington and Baltimore. 24 pp. ill. 8vo. *Washington, 1845*  
Reference to the origin of the Morse alphabet and the use of multiple wires for transmission of signals. Vail was a distinguished American electrician and inventor.  
—See also 1137.

1088. **Wartmann**, E(lie François). (1817-1886.) De la méthode dans l'électricité et le magnétisme à propos du Trattato del magnetismo e della elettricità, dell' Abbate Francesco Zantedeschi. (Biblioth. Univers. Suppl. Arch. l'Électricité. Vol. 5, 15 pp.) 8vo. *Geneva, 1845*  
The sequence of subjects in a course of electricity and magnetism. (Autograph copy, dedicated to Becquerel). (See No. 109obis.)  
—See also 1033.

DESCRIPTION  
OF THE  
AMERICAN  
ELECTRO MAGNETIC TELEGRAPH:  
NOW IN OPERATION BETWEEN THE CITIES OF  
WASHINGTON AND BALTIMORE.

ILLUSTRATED BY FOURTEEN WOOD ENGRAVINGS.

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BY ALFRED VAIL,

ASSISTANT SUPERINTENDENT OF ELEC. MAG. TEL. FOR THE U. S.

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"The same principle which justified and demanded the transference of the mail on many chief routes, from the horse-drawn coach on common highways to steam-impelled vehicles on land and water, is equally potent to warrant the calling of the electro magnetic telegraph—that last and most wondrous birth of this wonder-teeming age—in aid of the post office, in discharge of its great function of rapidly transmitting correspondence and intelligence."

REP. OF COM. OF WAYS AND MEANS OF H. R., 1845.

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Entered, according to Act of Congress, in the year 1845, by Alfred Vail,  
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WASHINGTON:

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1845.

1087. *VAIL. (Reduced.)*

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1089. **Wunschmann, O.** Ueber galvanische Elektricität in Bezug auf ihre technische Anwendung. 36 pp. 12mo. (Jahresbericht.)  
*Berlin, 1845*  
 Some industrial applications of the electro-current.

1090. **Zantedeschi, Francesco.** (1797-1873.) Di una macchina a disco per la doppia elettricità e delle esperienze eseguite con essa comparativamente a quelle dell'elettromotore voltiano. (Mem. Ist. Veneto, Vol. 2, pp. 171-181) 1 plate. 4to.  
*Venice, 1845*  
 Electrical machine permitting the use of the two kinds of electricity.

1090 bis.—Trattato del magnetismo e della elettricità. Vol. II, 546 pp. 4 plates. 8vo.  
*Venice, 1845*  
 Volume of special interest: Romagnosi's experiment, p. 2; Morichini and Mrs. Somerville on the (supposed) magnetizing power of violet light, p. 216; Faraday's discovery of magneto-electric induction anticipated by Abbate Zantedeschi, p. 357. (See No. 1088.)  
 —See also 950.

1091. **Arnoldi, Luigi.** Dei telegrafi elettrici. (Giorn. Arcadico, Vol. 108, pp. 79-106) 1 plate. 8vo.  
*Rome, 1846*  
 An electrical dial telegraph: refers to the inventions of Alfred Vail and others. (Autograph copy, dedicated to Volpicelli.)

1092. **Beckmann, Johann.** (1739-1811.) History of inventions, discoveries and origins, translated from the German by William Johnston. Fourth edition, revised and enlarged by William Francis and J(ohn) W(illiam) Griffith. 2 vols. portr. ill. 12mo.  
*London, 1846*  
 A work of much erudition. The author was professor at the University of Gottingen. Articles on magnetic cures, on tourmaline and lyncurium. (The Library has received by gift, too late for entry, a copy of the translation by William Johnston, 3 vols., 488+445+491 pp., London, 1797.)

1093. **Becquerel, (Antoine César.)** (1788-1878.) Traité complet du magnétisme. cxii+547 pp. 18 plates. 8vo.  
*Paris, 1846*  
 Extensive treatise on the laws and phenomena of magnetism with discussion of observations and theories of terrestrial magnetism.  
 —See also 882.

1094. **Boncompagni, (also Buoncompagni) (Ludovisi) Baldassare.** (1821-1894.) Intorno ad alcuni avanzamenti della fisica in Italia nei secoli xvi e xvii. (Giorn. Arcadico, Vol. 109, pp. 3-48) 8vo.  
*Rome, 1846*  
 Analysis of the scientific work of Giambaptista Porta, 1540-1615. Magnetic condition of the iron cross of St. Augustin's church at Rimini, p. 23.  
 —See also 1443.

1095. **Gloesener, (Michael.)** (1794-1876.) Notice sur deux petits appareils propres à changer la direction des courants électriques. (Mém. Soc. Sc., Liège, Vol. 2, pp. 489-492) 1, plates. 8vo.  
*Liège, 1846*  
 Note on apparatus for reversing the direction of a current.  
 —See also 1257, 1520, 1910.

1096. **Grove, (Sir) W(illiam) R(obert.)** (1811-1896.) On the correlation of physical forces being the substance of a course of

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lectures delivered in the London Institution in the year 1843. iv+52 pp. 8vo. Printed by order of the managers of the London Institution at the request of the proprietors. (*London*.) 1846 These lectures formed the basis of the author's famous work on the correlation of physical forces.

1096a.— —The correlation of physical forces. Second edition. vii+119 pp. 8vo.  
—See also 1017.

1097. **Haldat du Lys**, (Charles Nicolas Alexandre) de (1770-1852.) Deux mémoires sur le magnétisme. (Extract, *Mém. Soc. Sc., Nancy*) 40+19 pp. 1 plate. 8vo. Nancy, 1846 Considerations on general diamagnetic phenomena.  
—See also 979.

1098. **Highton**, E(dward.) On the effects of atmospheric electricity, as exemplified in the storms of the summer of 1846. 28 pp. ill. 4to.  
Practical rules concerning lightning conductors.  
—See also 1231, 3062.

1099. **Hunt**, Robert. (1807-1887.) Researches on the influence of magnetism and voltaic electricity, on crystallization, and other conditions of matter. (*Mem. Geol. Surv. Great Britain*, Vol. I, pp. 433-459) ill. 8vo. London, 1846 Relations between molecular forces and the phenomena of magnetism and electricity.  
—See also 1205, 2768.

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1101. **Peltier**, Jean Charles Athanase (fils). Essai sur la coordination des causes qui précèdent, produisent et accompagnent les phénomènes électriques. (*Mém. Couronnés Acad. Sc., Bruxelles*, Vol. 19, pp. 1-69) 1 plate. 4to. Brussels, 1846 Theoretical views on static electricity; electric and magnetic induction.  
—See also 1080.

1102. **Petrina**, Franz (Adam). (1799-1855.) Neue Theorie des Elektrophors, and ein neues Harzkuchen-Elektroskop. (Abh. Boehm. Akad. Wiss. Vol. 4, pp. 525-546) 1 plate. 4to.  
Prague, 1846 The first part of the paper is devoted to the history of the electrophorus and the condenser.  
—See also 1066.

1103. **Poggendorff**, (Johann Christian). (1796-1877.) Ueber ein Problem bei linearer Verzweigung elektrischer Stroeme. (*Sitz. Ber. Akad. Wiss. Math.-Nat. Kl. Berlin*, 1846, pp. 3-16) 8vo.  
Berlin, 1846 Current-division in multiple circuits.  
—See also 1027.

1104. **Reichenbach**, (Karl Ludwig Friedrich) von. (1788-1869.) Abstract of researches on magnetism and on certain allied sub-

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jects including a supposed new imponderable. Translated and abridged from the German by William Gregory. 112 pp. 2 plates. 8vo. *London, 1846*  
The author holds that there are two kinds of force in a magnet, one of which attracts iron while the other acts on the nervous system.  
—See also 1188.

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Observations of current phenomena prior to the invention of the voltaic "pile" with reference to original papers.

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History of the subject.  
—See also 2875.

1108. **S**teinberg, K(arl.) (1812-1852.) *Die Dynamide, Elektricitat, Magnetismus, Licht, Waerme, Verwandtschaftslehre und Stoechiometrie. Compendium zu Vorlesungen ueber allgemeine Chemie.* 83 pp. 8vo. *Berlin, 1846*  
Rudiments of electricity, magnetism and heat.

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Researches in confirmation of Coulomb's law of the inverse square of the distance.  
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The great work of Weber on absolute measurement; also his research on diamagnetism. (Autograph copy).  
—See also 920, 1242, 1273, 1400, 1563, 2118, 2785.

1111. **A**rcher, Charles Maybury. *The London anecdotes; anecdotes of the electric telegraph.* 128 pp. 16mo. *London, (1847)*

1111a.—(Another edition.) 2 vols. 16mo. *London, 1848*  
—See also 1219.

1112. **B**ecquerel, Antoine César. (1788-1878.) & (Alexandre) E(dmond) **B**ecquerel. (1820-1891.) *Éléments de physique terrestre et de météorologie.* 706 pp. 14 plates, tables. 8vo. *Paris, 1847*  
Contains chapters on atmospheric electricity, terrestrial magnetism, and polar aurorae.  
—See also 882, 1439.



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1110. WEBER. (See No. 4377.)

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 —See also 911.

1120. **Osann**, G(ottfried) W(ilhelm.) (1797-1866.) *Grundzuege der Lehre von dem Magnetismus und der Elektricitat.* viii+183 pp. ill. 8vo.  
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 Elementary textbook on magnetism and electricity.

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 Magnetism and electricity treated experimentally.

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—See also 1335, 2977.

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The "errors" dwelt on are that water is decomposable, that hydrogen is an elementary body, and that there are two kinds of electricity and magnetism.

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The integral refers to the distribution of electricity on an infinite plane, subject to the influence of an electrified point.

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A mathematical paper.

1136.——*On a system of magnetic curves.* (Cambridge and Dublin Math. Journ. Vol. 2, p. 240) 8vo. *Cambridge, 1847*  
Short mathematical paper giving the equation of a system of magnetic curves due to two small magnetic needles.  
—See also 1085.

1137. **Vail**, Alfred. (1807-1859.) *American electro-magnetic telegraph; with the reports of Congress, and a description of all telegraphs known, employing electricity or galvanism.* 208 pp. ill. 8vo. *Philadelphia, 1847*  
Description of historical telegraphs with 81 illustrations; also letters from Morse and Henry. The Morse code, p. 27.

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1137a.— —(French translation.) Le télégraphe électro-magnétique Américain avec le rapport du Congrès et la description de tous les télégraphes connus, où sont mis en usage l'électricité et le magnétisme. Traduit par H(ypp) Vattemare. 263 pp. ill. 8vo. *Paris, 1847*

1137b.— —(Italian translation) Le meraviglie delle telegrafia elettrica ossia telegrafo elettro-magnetico-American. Opera di Alfr. Vail, tradotta dall' inglese in francese da Ipp. Vattemare e voltata in Italiano da Lorenzo Polettini. Con note ed aggiunte. viii+171 pp. 5 plates. 8vo. *Verona, 1850*  
—See also 1087.

1138. **Wartman**, Elie (François.) (1817-1886.) Troisième mémoire sur divers phénomènes d'induction (Bull. Acad. Sc., Belgique, Vol. 14, pp. 187-204) 1 plate. 8vo. *Brussels, 1847*  
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The electric current is not due to a process of rectilinear propagation.  
—See also 1033.

1139. **Behr**. Ueber elektrische Telegraphen. 19 pp. 4to. (Programm.) *Konigsberg, 1848*  
Some considerations about the electric current and its application to telegraphy.

1140. **Bird**, Golding. (1814-1854.) Elements of natural philosophy; being an experimental introduction to the study of the physical sciences. Third edition. liv+552 pp. ill. 12mo. *London, 1848*  
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1141. **Drescher**, L. Die elektromagnetische Telegraphie: oder leichtfassliche und specielle Beschreibung der vorzueglichsten elektromagnetischen Telegraphen-Apparate und die Anwendung derselben in der Praxis. 38 pp. 4 plates. 4to. *Cassel, 1848*  
Equipment for electromagnetic telegraphy.

1141a.— Second edition. 38 pp. 4 plates. 4to. *Cassel, 1849*

1142. **Gregory**, Olinthus (Gilbert). (1774-1841). Mathematics for practical men: being a common-place book of pure and mixed mathematics, designed chiefly for the use of civil engineers, architects and surveyors. Third edition, revised and enlarged by Henry Law. xx+392 pp. +118 pp. (Appendix) 13 plates. 8vo. *London, 1848*  
Written for the use of architects and engineers.  
—See also 738.

1143. **Harris**, (Sir) W(illiam) Snow. (1792-1867.) Rudimentary electricity, being a concise exposition of the general principles of electrical science, and the purposes to which it has been applied. iv+160 pp. ill. pl. 12mo. *London, 1848*

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1143a.—Third edition. vi+195 pp. ill. pl. 12mo. *London, 1853*  
 This edition contains many references to the (then) unpublished works of Cavendish; Eele's electrical theory, p. 43.  
 —See also 801.

1144. **Martin**, William. (1801-1867.) Illustrated natural philosophy being a manual of modern science for schools and families. Sixth edition. x+314 pp. ill. 12mo. *London, (1848)*  
 Three short chapters on the elements of magnetism and electricity.

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 Letter to Dr. Dove giving some views on the nature of electricity.  
 —See also 825.

1146. **Poppe**, (Otto Heinrich) Adolph. (1813-1894.) *Die Telegraphie von ihrem Ursprunge bis zur neuesten Zeit, mit besonderer Beruecksichtigung der ausgefuehrten telegraphischen Systeme.* iv+75 pp. 8vo. *Frankfort, 1848*  
 History and use of methods employed in mechanical and optical signaling.

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 Note on the part played by electricity in certain geological formations.

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 —See also 1297, 1336, 3144.

1149. **Ronalds**, (Sir) Francis. (1788-1873.) Epitome of the electro-meteorological and magnetic observations, experiments, etc., made at the Kew observatory. 12 pp. 8vo. *Chiswick, 1848*  
 Occasional notes on atmospheric electricity.  
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1150. **Thomson**, (Sir) William (Lord Kelvin.) (1824-1907.) On the mathematical theory of electricity in equilibrium. (*Cambridge and Dublin Math. Journ.*, Vol. 3, pp. 131-148+266-274; Vol. 4, pp. 276-284; Vol. 5, pp. 1-9.) 8vo. *Dublin, 1848-1850*  
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 Popular account of the needle telegraph.

1152. **Barlow**, Peter. (1776-1862.) *Electro-magnetism.* (*Encyclopedie Metropolitana*, 2nd ed. pp. 1-40.) 5 plates. 4to. *London, 1849*  
 Historical treatment of the subject.  
 —See also 720.

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—See also 1250, 1575, 2831.

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Celebrated work containing the history and physics of several electric and magnetic inventions and discoveries with copious notes by the editor.  
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1161. **Moigno, F**(rançois Napoléon Marie.) (1804-1884.) *Traité de télégraphie électrique, reinfermant son histoire, sa théorie et la description des appareils, avec les deux mémoires de M. Wheatstone sur la vitesse et la détermination des courants d'électricité, et un mémoire inédit d'Ampère sur la théorie électro-chimique.* xxiv+420 pp. 16 plates. 8vo. *Paris, 1849*  
 One of the early manuals of telegraphy containing theory, practise, and history. Abbé Moigno was eminent as mathematician and physicist. (See No. 2910.)

1161a.——*Traité de télégraphie électrique, comprenant son histoire, sa théorie, ses appareils, sa pratique, son avenir, sa législation; précédé d'un exposé de la télégraphie en général et de la télégraphie ancienne du jour et de nuit.* 2 ième édition, entièrement refondue et complétée. 2 vols.—Text and atlas—22 plates. 8vo. *Paris, 1852*  
 Two errors may be noted: 1) the date of Coxe's apparatus is 1816 not 1810; 2) the needles in Baron Schilling's telegraph were horizontal not vertical.  
 —See also 3310.

1162. **Murray, (Sir) James.** (1788-1871.) *Electricity, as a cause of cholera, or other epidemics, and the relation of galvanism to the action remedies.* 160 pp. 12mo. *Dublin, 1849*  
 Chapter on the earth as a magnet.

1163. **Petrina, Franz (Adam.)** (1799-1855.) *Einfluss der Entfernung des Polardrahtes von der Magnetenadel auf das Maximum ihrer Ablenkung.* (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl. Jahrg. 1849, pp. 165-168) 8vo. *Vienna, 1849*  
 Deflection and oscillations of a magnet by a current in a neighboring conductor. (Autograph copy, dedicated to Prof. Joh. Mueller).  
 —See also 1066.

1164. **Pluecker, J(ulius.)** (1801-1868.) *Enumeratio novorum phænomenorum de magnetismo inventorum.* 28 pp. 1 plate. 4to. (Program.) *Bonn, 1849*  
 Diamagnetic phenomena and magne-crystallic behavior of certain crystalline substances.  
 —See also 1295, 2888.

1165. **Smee, Alfred.** (1818-1877.) *Elements of electro-biology; or the voltaic mechanism of man; of electro-pathology and especially of the nervous system and of electro-therapeutics.* xii+164 pp. 2 tables. 8vo. *London, 1849*

1165a.——*Principles of the human mind deduced from physical laws, being a sequel to elements of electro-biology; together with the lecture on the voltaic mechanism of man, delivered at the London Institution, April 11, 1849.* xvi+16 pp. ill. 8vo. *London, 1849*  
 —See also 1006.

1166. **Steinheil, K(arl) A(ugust.)** (1801-1870.) *Beschreibung und Vergleichung der galvanischen Telegraphen Deutschlands*

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nach Besichtigung im April, 1849. (Abh. Bayer. Akad. Wiss. Math.-Nat. Kl. Vol. 3, Abt. III., pp. 779-840) 8vo.

Munich, 1849

German telegraph lines with suggestions for improvements.

—See also 947.

1167. Adriani, A. Verhandeling over gutta percha en caoutchouc en derzelver verhouding tot onderscheidene agentia. 75 pp. 8vo. Utrecht, 1850  
Tests to distinguish gutta percha from caoutchouc.

1168. Burnett, C(harles) M(ountford.) (1807-1866.) Philosophy of spirits in relation to matter. xx+312 pp. 8vo. London, 1850  
Work of pure imagination.

1169. Clark, Edwin. (1814-1894.) The Britannia and Conway tubular bridges with general inquiries on beams and on the properties of materials used in construction, published with the sanction and under the immediate supervision of Robert Stephenson. 2 vols. Atlas in folio. ill. 18 plates. 8vo. London, 1850  
Mr. Edwin Clark was the resident engineer in charge of the construction and for a time had his younger brother Josiah Latimer Clark with him as assistant engineer. (See Nos. 2897, 4119.)  
—See also 2069, 2972.

1170. Comstock, John Lee (1789-1858) & R. D. Holbyn. First book of heat, light, and optics, and electricity. 128 pp. 16mo. (Scott's first books in science.) London, (1850?)  
Three chapters condensed from the author's *Manual of Natural Philosophy*.  
—See also 1485.

1171. Cornelius, Karl Sebastian. (1820-1896.) De fluido electrico in rerum natura statuendo. 15 pp. 8vo. Halle, 1850  
Views of Franklin, Symmer and Faraday discussed.

1172. Du Bois-Reymond, E(mil) Heinrich. (1818-1896.) Sur les mémoires relatifs aux phénomènes électrophysiologiques. (Extract, Comptes rendus, Acad. Sc. Vol. 31, 1850) 20 pp. 4to. Paris, 1850  
Résumé of work done in electro-physiology with special reference to that of the author.  
—See also 1202, 1222, 1254, 1280, 1516, 1541, 1769, 1903.

1173. Felici, R(iccardo.) Sulle polarita galvaniche secondarie e sull'influenza del calore della corrente elettrica nei liquidi. (Ann. Univ., Toscana Sc. Cosm. Vol. 2, pp. 173-186) 4to. Pisa, 1850  
The e. m. f. of polarization and effect of heat on the conductivity of liquids.  
—See also 1283, 1797.

1174. Francis G(eorge) William. (1800-1865.) Electrical experiments; illustrating the theory, practice, and application of the science of free or frictional electricity. Fifth edition. 91 pp. ill. 8vo. London, 1850  
Numerous entertaining experiments in frictional electricity; illustrations of historical machines. The author was a popular lecturer on natural philosophy.

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1175. **Froriep**, Robert. (1804-1861.) On the therapeutic application of electro-magnetism in the treatment of rheumatic and paralytic affections; translated from the German by R. M. Lawrence. 205 pp. 8vo. *London, 1850*

1176. **Galton**, Francis. The telotype; a printing electric telegraph. 32 pp. 4 plates. 8vo. *London, 1850*  
Messages printed in the ordinary alphabetical characters; manuscript letter of the author.

1177. **Ghisi**, Lorenzo Agostino. *Telegrafia elettrica, ossia descrizione dei telegrafi elettro-magnetici, loro modo di agire e loro applicazione agli usi sociali.* Second edition, enlarged and corrected. 76 pp. 2 plates. 8vo. *Milan, 1850*  
Paper of general information on telegraphy.

1178. **Grieb**, Chr(istoph.) Fr(iedrich.) *Die Wunder der elektrischen Telegraphie; eine gemeinverstaendliche Geschichte und Beschreibung derselben, nebst Andeutungen ueber ihre zukuenftige Wirkung.* 208 pp. 2 plates. 16mo. *Stuttgart, 1850*  
Some of the wonders of the electric telegraph briefly described.

1179. **Gundolf**. *Ueber elektromagnetische Telegraphie.* 24 pp. 4to. (Jahresbericht, Gymnasium Theodorianum.) *Paderborn, 1850*  
The electro-magnetic dial telegraph.

1180. **Harris**, (Sir) William Snow. (1792-1867.) *Rudimentary magnetism: being a concise exposition of the general principles of magnetical science.* 3 parts. ill. 12mo. *London, 1850-1852*  
The author's compass is described p. 149.

1180a.— —Second edition revised and enlarged by Henry M. Noad. viii+412 pp. ill. 12mo. (Weale's Rudimentary Series, No. 8.) *London, 1872*  
—See also 801.

1181. **Mackrell**, G., J. W. **Gann** and Thomas **Pollock**. *On the action upon the galvanometer by arrangements of coloured liquids in a U tube.* 50 pp. 8vo. *London, 1850*  
Observations on electric induction and the electric state of the atmosphere.  
—See also 870.

1182. **Marié-Davy**, (Edme Hippolyte). (1820-1893.) *Mémoire (I., II., & III.) sur l'électricité.* (Mém. Acad. Sc., Montpellier, 1847-1850, pp. 13-159) 4to. *Montpellier, 1850*  
Three short memoirs on the voltaic battery and Ohm's law.  
—See also 1525, 3302.

1183. **Maus**, (Jean Marie) Henrie and Pierre **Paleocapa**. (1789-1867.) *Rapport sur les études du chemin de fer de Chambéry à Turin et de la machine proposée pour exécuter le tunnel des Alpes entre Modane et Bardonnèche et Rapport rédigé, au nom de la commission chargée de l'examen de ces études, par M. le chevalier Pierre Paleocapa, suivi des Procès-verbaux des*

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séances de cette commission. 56 pp. 9 plates and maps.  
Folio. *Turin, 1850*

This engineering report is followed by maps of the country and places of the proposed railway route from Chambery to Turin.

1184. **Oersted**, Hans Christian. (1770-1851.) *Gesammelte Schriften*, deutsch von K. L. Kannegiesser. 6 vols. pls. portr. 8vo.  
*Leipzig, (1850-1851)*

Views concerning matter and spirit; sound, astronomy, sympathy, preceded by a biographical notice.

1185.——**Der Geist in der Natur.** Deutsch von K. L. Kannegiesser nebst einer biographischen Skizze von P. L. Moeller. xxxii+200 pp. 8vo.  
*Leipzig, 1850*

Biographical notice of Oersted followed by some of his views on nature and superstitions.

1185a.——(English translation.) *Soul in nature with supplementary contributions.* Translated from the original German edition by L(eonora) and J(oanna) B. Horner. xlv+465 pp. portr. 12mo. (Bohn's Scientific library.) *London, 1852*

1186.——**Die Naturwissenschaft in ihrem Verhaeltniss zur Dichtkunst und Religion.** xvi+71 pp. 8vo.  
*Leipzig, 1850*  
Some of the author's views on religion.  
—See also 773.

1187. **Quetelet**, (Lambert) A(dolphe Jacques.) (1796-1874.) *Résumé des observations sur la météorologie et sur le magnétisme terrestre.* (Observatoire R. de Bruxelles) 76 pp. 4to.  
*Brussels, 1850*  
General meteorological data for Belgium, (Autograph copy).  
—See also 968.

1188. **Reichenbach**, Karl (Ludwig Friedrich von.) (1788-1869.) *Researches on magnetism, electricity, heat, crystallization, and chemical attraction, in their relation to the vital force.* Translated and edited by the express desire of the author with a preface, notes and appendix by William Gregory. Parts I & II. (No more published) xlv+463 pp. ill. 3 plates. 8vo.  
*London, 1850*

Instances of persons who seemed to the author to be affected by a strong magnetic field.  
—See also 1104.

1189. **Secchi**, A(ngelo). (1818-1878.) *Sullo stato attuale delle telegrafia. Relazione.* (Ann. Sc. Math. Fis. Vol. I, pp. 23-41.) 8vo.  
*Rome, 1850*

The three telegraph systems used in America; the author was the distinguished Jesuit astronomer.  
—See also 1240, 3147.

1190. **Sturgeon**, William. (1783-1850.) *Scientific researches, experimental and theoretical, in electricity, magnetism, galvanism,*



1184. OERSTED. (See No. 4377.)

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electro-magnetism and electro-chemistry. viii+563 pp. 19 plates. 4to. *London, (1850)*

This quarto volume contains the author's description of his discoveries of the soft-iron electro-magnet (bar and horse-shoe,) his electro-magnetic engine, commutator amalgamated zinc plates, study of atmospheric electricity by means of kites, fracture of Leyden jars, etc., the whole preceded by a history of electro-magnetism carried down to 1823 and followed by 19 plates of illustrations.

—See also 925.

1191. **Szapary**, (Franz.) *Magnetismus von 1850*. I. Grundton (zur Harmonie der Wissenschaften). II. Aries. 152+120 pp. 1. 8vo. *Gratz, 1850*

A miscellany with an article on "magnetic colloquizing."

1192. **Walker**, A(dam.) (1731-1821.) *Analysis of a course of lectures on natural and experimental philosophy*. Fourth edition. 90 pp. 8vo. *(London, 1850)*

Short lecture on electricity: "Many experiments tend to prove the electrical fluid to be elementary phlogiston", p. 60.

—See also 618.

1193. **Wilmot**, Arthur Parry Eardley. *Complete and universal dictionary of signals for the boats of Her Majesty's fleet, well adapted for yachts, the merchants service, etc.; containing a variety of new and simple modes of signaling*. 24 1.+xxiv+181 pp. ill. 24 plates. 16mo. *London, 1850*

Flags, balls, and semaphores used in the British navy.

1193a.—Second edition, 24 1.+xxiv+28 pp. ill. 24 plates. 18mo. *London, 1851*

1194. **Alexander**, William. *Plan and description of the original electro-magnetic telegraph, with prefatory note to the Royal Commissioners*, 30 pp. 1 plate. 8vo. *London, & Edinburgh, 1851*

Letters written in 1837 by Lord John Russell relating to the author's proposal to establish telegraphic communication between Edinburgh and London by underground conductors; description of apparatus.

1195. **Amberger**, (François Joseph Jérôme) **Nicklès** (1820-1869) and **Cassal**. *Application de l'électro-magnétisme dans la locomotion sur chemins de fer et dans les transmissions de mouvement*. (Extract, *Revue Scient. et industr. Ser. iii., Vol. 9.*) 8 pp. 8vo. *Paris, 1851*

Note on the application of electro-magnets to traction.

—See also 1265.

1196. **Billet**, (Felix.) (1808-1882.) *Des condensations électriques de deuxième et de troisième espèce*. (Mém. Acad. Sc., Dijon, 1851, pp. 66-72.) 8vo. *Dijon, 1851*

Experiments with plate condensers.

—See also 2928.

1197. **Brewster**, (Sir) David. (1781-1868.) *Popular treatise on magnetism from the Seventh edition of the Encyclopaedia Britannica*. 363 pp. ill. map. 8vo. *Edinburgh, 1851*

Written for the seventh edition of the Encyclopaedia Britannica. The chap-

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ters on terrestrial magnetism and magnetic instruments are of special interest. The volume contains Prof. Barlow's magnetic chart of lines of equal declination with position of magnetic pole as deduced from observations of Commander Ross. Zantedeschi's observations on the action of light on a magnet, p. 49.

—See also 1315, 2995.

1198. **Bruck**, (Nicolas) R(ené.) *Electricité ou magnétisme du globe terrestre.* 3 vols. 4 charts. 8vo. *Brussels, 1851-1852*  
Analysis and discussion of observations of terrestrial magnetism.

1199. **Buff**, Heinrich. (1805-1878.) *Familiar letters on the physics of the earth treating of the chief movements of the land, the waters, and the air, and the forces that give rise to them;* edited by A. W. Hofmann. xiii+273 pp. 12mo. *London, 1851*  
The last letter treats of atmospheric electricity and lightning.  
—See also 1009.

1200. **Chalmers**, Charles. *Thoughts on electricity with notes of experiments.* Third edition. 57 pp. ill. 2 plates. 8vo.  
*Edinburgh, 1851*  
These thoughts refer chiefly to the electric decomposition of water, and potash.  
—See also 1350, 1413.

1201. **Dods**, John Bovee. *Philosophy of electrical psychology.* 252 pp. 12mo. *New York, 1851*  
Contains a wide range of subjects; "electric psychology" is considered to be the most sublime system of philosophy.

1202. **Du Bois-Reymond**, (Emil Heinrich). (1818-1896.) *Untersuchungen ueber thierische Elektricität.* (Moleschott, Untersuchungen, Vol. II., pp. 137-157+247-284.) 8vo.  
*Frankfort, 1851*  
Extensive research on animal electricity.  
—See also 1172.

1203. **Gerke**, Fr. Clemens. *Der praktische Telegraphist oder die elektro-magnetische Telegraphie.* 144 pp. ill. 8vo. *Hamburg, 1851*  
Telegraphic apparatus and mode of working explained.

1204. **Hitchcock**, Edward. (1793-1867.) *Religion of geology and its connected sciences.* 408 pp. 1 plate. 12mo. *Glasgow, (1851)*  
Fourteen lectures on religio-scientific matters.

1205. **Hunt**, Robert. (1807-1887.) *Elementary physics, an introduction to the study of natural philosophy.* vi+486 pp. ill. 1 plate. 12mo. *London, 1851*  
General description of electric and magnetic phenomena.  
—See also 1099.

1206. **Lallemand**, (Etienne) ALEXANDER. (1816-1886.) *Étude des lois de l'induction à l'aide de la balance électro-dynamique.* 54 pp. 4to. (Thèse.) *Paris, 1851*  
Experimental study of the action of induced currents of different orders on each other and on the primary.

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1207. **Laming**, Richard. Matter and force, an analytical and synthetical essay on physical causation; their nature and laws analytically derived and synthetically applied: a new system founded upon the gravitation of electricity and proving the universe to be sustained by a moral power. With an essay on the philosophy of physical science. 114 pp. 5 plates. 8vo.  
*London, 1851*  
 Metaphysical dissertation on the nature of matter and force.  
 —See also 961.

1208. **Lamont**, (Johann) von. (1805-1879.) Astronomie und Erdmagnetismus. (From Neue Encyclopedie der Wissenschaften und Kuenste.) xviii+280 pp. 5 plates. 8vo *Stuttgart, 1851*  
 Sketch of terrestrial-magnetism; history and theory.  
 —See also 1049.

1209. **Locke**, John. (1792-1856.) Observations on terrestrial magnetism. 29 pp. 4to. *Washington, 1851*  
 The observations were made in 1845 and the two following years to determine the declination, dip and total force in several parts of the United States.

1210. **Magnus**, (Heinrich) G(ustav.) (1802-1870.) Ueber thermoelektrische Stroeme. (Abh. Akad. Wiss. [Phys.] 1851, pp. 1-32.) 1 plate. 4to. *Berlin, 1851*  
 Important contribution to our knowledge of thermo-electricity.  
 —See also 3065.

1211. **Mayer**, J(ulius) R(obert). (1814-1878.) Bemerkungen ueber das mechanische Aequivalent der Waerme. 56 pp. 8vo.  
*Heilbronn, 1851*  
 This is the author's celebrated paper on the mechanical equivalent of heat.

1212. **Napier**, James. (1810-1884.) Manual of electro-metallurgy including the application of the art to manufacturing processes. xii+142 pp. ill. 8vo. (Encyclopaedia Metropolitana, Vol. 14.) *London, 1851*  
 Practical book based on personal experience.

1212<sup>†</sup>bis. **Reid**, D(avid) B(oswell) (1805-1863) and Alexander **Bain** (1818-1877). Elements of Chemistry and Electricity. In two parts. Edited by D. M. Reese. 410 pp., plates. 12mo. (Chamber's Educational Course, No. 4.) *New York, 1851*  
 American re-edited edition. The portion treating of electricity (by Bain, who on the title page is described as "the inventor of the electric clock") occupies pp. 225-364, with separate illustrations on pp. 403-410. The volume is designed to introduce the teaching of science as an elementary branch of education "in all schools and academies."  
 —See also 995.

1213. **Rutter**, J. O. N. Magnetoid currents, their forces and directions with a description of the magnetoscope. To which is subjoined a letter from William King (on the same subject). 47 pp. 4to. *London, 1851*  
 The human body in contact with the earth "becomes a real magnet, surrounded by a magnetic aura and possessing magnetic polarities," p. 43.  
 —See also 1299.

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1214. **Siemens, (Ernst) Werner.** (1816-1892.) Kurze Darstellung der an den preussischen Telegraphen-Linien mit unterirdischen Leitungen bis jetzt gemachten Erfahrungen. 31 pp. 8vo. *Berlin, 1851*  
The use of underground conductors.

1215.—Mémoire sur la télégraphie électrique suivi du rapport fait sur ce mémoire à l'Académie des Sciences de Paris dans sa séance du 29 Avril, 1850. (Extract, Ann. Chim. Phys. Ser. III, Vol. 29, pp. 385-430, & Comptes rendus Acad. Sc. Paris, Vol. 31.) 64 pp. 8vo. *Berlin, 1851*  
This memoir contains a chapter on the telegraphic circuit and another on some electric apparatus devised by the author.  
—See also 1502, 1655, 1700, 1924, 1956, 2005, 2196, 2260, 3259.

1216. **Smee, Alfred.** (1818-1877.) Lecture on electro-metallurgy. 23 pp. ill. 8vo. *London, 1851*  
The Smee cell.  
—See also 1006.

1217. **Book of the telegraph.** 44 pp. ill. 12mo. *Boston, 1851*  
History and description of the electric telegraph.

1218. **Allen, Z(achariah).** (1795-1882.) Philosophy of the mechanics of nature, and the source and modes of action of natural motive-power. xvi+797 pp. ill. 8vo. *New York, 1852*  
Diffuse treatment of general electric and magnetic phenomena.

1219. **Archer, Charles Maybury.** Guide to the electric telegraph showing the every-day practical utilities with a scale of charges for messages, list of communication-stations, etc., with illustrative map of the entire network of telegraphic communication in Great Britain. 62 pp. 1 map. 16mo. *London, 1852*  
Collection of anecdotes relating to the early days of the electric telegraph; map of England showing the lines and stations of the Electric Telegraph Company, 1852. (See No. 2933.)  
—See also 1111.

1220. **Bain, Alexander.** (1818-1877.) Short history of electric clocks, with explanations of their principles and mechanism, and instructions for their management and regulation. 31 pp. ill. 8vo. *London, 1852*  
Paper of general information on electric clocks.  
—See also 995.

1221. **Beetz, W(ilhelm) von.** (1822-1886.) Ueber Magnetismus. Ein Vortrag, gehalten im Wissenschaftlichen Verein, 13. Maerz 1852. 28 pp. 8vo. *Berlin, 1852*  
Historical notes on the compass; Faraday's researches on diamagnetism; polar aurorae.  
—See also 2065, 3491.

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1222. **Du Bois-Reymond, Emil (Heinrich).** (1818-1896.) On animal electricity. Edited by H. B. Jones. xiii+214 pp. ill. 12mo. *London, 1852*  
Experiments made by the eminent physiologist to show the action of electric currents upon the nerves and muscles of the animal system. (See No. 1254.)  
—See also 1172.

1223. **Du Moncel, Théodore Achille Louis.** (1821-1884) Des électromoteurs. Second edition. 60 pp. 8vo. *Paris, 1852*  
General considerations on the electro-magnet and its application to produce continuous rotation.

1224.—Discours d'ouverture. Magnétisme statique et magnétisme dynamique. (Mém. Soc. Sc. Cherbourg, Vol. I, pp. 1-72.) 8vo. *Cherbourg, 1852*  
Some general phenomena of electro-dynamics considered in the light of the two-fluid theory.  
—See also 1255, 1281, 1351, 1387, 1415, 1452, 1486, 1594, 1740, 1796, 1863, 1904, 1973, 2023, 2073, 2137, 2277, 2313, 3343.

1225. **Forsach, J. A.** Katechismus der elektrischen Telegraphie. x+58 pp. ill. 12mo. *Leipzig, 1852*  
A telegraph primer.

1226. **Garvey, Michael Angelo.** (?-1877.) The silent resolution or the future effects of steam and electricity upon the condition of mankind. xii+212 pp. 12mo. *London, 1852*  
Some careful writing about the wonders of electricity.

1227. **Gelder, P. J. M. de.** Beschrijving van den electro-magnetischen druckotelegraph van Morse. 70 pp. 4 plates. 12mo. *Leyden, 1852*  
Description of Morse's telegraph.

1228. **Glaisher, James.** (1809-1903.) Philosophical instruments and processes as represented in the Great Exhibition. (From Lectures on the results of the exhibition delivered before the Society of Arts.) Lecture IX, pp. 323-402. 12mo. *London, 1852*  
Remarks on the scientific instruments shown at the London Exhibition, 1851.

1229. **Haldat, du Lys, (Charles Nicolas Alexandre) de.** (1770-1852.) Exposition de la doctrine magnétique, ou, Traité philosophique, historique et critique du magnétisme. viii+320 pp. 4 plates. 8vo. *Nancy, 1852*  
Philosophical treatise on the nature of magnetic phenomena.  
—See also 979.

1230. **Harris, (Sir) William Snow.** (1792-1867.) Record of philosophical papers and other scientific works. 7 pp. 8vo. *Plymouth, (1852?)*  
List of the author's scientific papers.  
—See also 801.

1231. **Highton, Edward.** Electric telegraph, its history and progress. xii+179 pp. ill. 12mo. *London, 1852*  
Historical electric telegraphs; also electric clocks and regulators of time.  
—See also 1098.

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1232. **Jones**, Alexander. Historical sketch of the electric telegraph; including its rise and progress in the United States. xiii+194 pp. ill. 8vo. *New York, 1852*  
Chronology of electric telegraphy and brief account of methods and apparatus used; determination of longitude, communication of time.

1233. **Kneller, C.** Die elektrischen Telegraphen. 62 pp. ill. 12mo. *Stuttgart, 1852*  
General account of various telegraph systems.

1234. **Knochenhauer, K(arl) W(ilhelm).** (1805-1875.) Versuche ueber die elektrische Induktion. (Arch. Math. Phys., Vol. 19, pp. 53-69+97-118.) 1 plate. 8vo. *Greifswald, 1852*  
Experiments on inductive effects due to Leyden jar discharges.  
—See also 1285, 1363, 1549, 3457.

1235. **Kreil, Karl.** (1798-1862.) Einfluss des Mondes auf die magnetische Declination. (Denkschriften Akad. Wiss. Math.-Nat. Kl., Vol. 3, pp. 1-47.) 4to. *Vienna, 1852*  
Influence of heavenly bodies on magnetic declination.  
—See also 1262, 3003.

1236. **Lardner, Dionysius.** (1793-1859.) The great exhibition in London in 1851. xxviii+630 pp. 8vo. *London, 1852*  
Popularly written articles on the telegraph, lightning-conductors.

1237.—Popular essays on scientific subjects comprising steam, artificial light, photography, etc., to which are added various essays on industrial subjects by Baron C. Dupin, M. Chevalier, T. Lamoine and Hector Berlioz. xxviii+630 pp. ill. 8vo. *London, 1852*  
This miscellanea contains popularly written chapters on electrical matters, Froment's engine, Foucault's pendulum etc.  
—See also 876.

1238. **Liais, Emmanuel.** (1826?-1900.) Sur la substitution des électro-moteurs aux machines à vapeur, et description d'un électro-moteur d'une grande puissance et d'une horloge électromagnétique à force régulatrice rigoureusement constante. 24 pp. 8vo. *Paris, 1852*  
Argument for substituting electric for steam motors.

1239. **Pacini, Filippo.** (1812-1883.) Sulla struttura intima dell' organo elettrico del gymnoto e di altri pesci elettrici, sulle condizioni elettro-motrici di questi organi, e loro comparazione a diverse pile elettriche. Letta nel di 19 settembre 1852. (Reprinted from Gazz. med. Ital. feder. tosc., Firence 1852.) 35 pp. ill. 8vo. *Florence, 1852*  
The electric organ of the gymnotus with numerous illustrations.

1240. **Secchi, A(ngelo).** (1818-1878.) Researches on electrical rheometry. (Smithsonian Contributions to Knowledge.) 59 pp. 3 plates. 4to. *Washington, 1852*  
Action of a current on a magnetic needle, wherever placed.  
—See also 1189.

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1241. Eijk, J(an) A(driaan) van. *Het St. Elmus vuur.* (Album der Natur, 1852, Aflev. 8, pp. 251-256.) 8vo. *Harlem, 1852*  
Note on "St. Elmos fires"; origin of the same. (Autograph copy).

1242. Weber, Wilhelm (Eduard). (1804-1891.) *Elektrodynamische Maasbestimmungen, insbesondere ueber Diamagnetismus.* (Abh. Saechs. Ges. Wiss., Vol. 1, pp. 485-577.) tabl. 4to. *Leipzig, 1852*  
The author's celebrated researches on diamagnetism.

1243.——*Elektrodynamische Maasbestimmungen, insbesondere Widerstandsmessungen.* (Abh. Saechs. Ges. Wiss., Vol. 1, pp. 199-382.) 4to. *Leipzig, 1852*  
Determination of resistance in absolute measure.  
—See also 1110.

1244. Wilson, George. (1818-1859.) *Electricity and the electric telegraph; together with the chemistry of the stars; an argument touching the stars and their inhabitants.* 77+52 pp. ill. 12mo. *London, 1852*  
Brief history of electrical discovery followed by description of the essentials of the electric telegraph; florid style.  
—See also 1473, 2855.

1245. Abria, (Jérémia Joseph Benoit). (1811-1892.) *Rapport sur l'éloge de M. de Romas.* (Actes Acad. Sc. Bordeaux, 1853, pp. 441-446.) 8vo. *Bordeaux, 1853*  
The author concedes to Franklin the discovery of the effects of points, but claims for M. de Romas the prior use of the kite for the electrical exploration of the atmosphere; impugns the authority of Priestley.  
—See also 2774.

1248. Assezat, J(ules) (1832-1876) and H. Debuire. *Magnétisme et crédulité.* 14 pp. 8vo. *Paris, 1853*  
The authors try to show the possibility of table-turning by personal electricity.

1249. Bakewell, F(rederick) C(olier). *Electric science; its history, phenomena and applications.* 199 pp. ill. 4 plates. 8vo. *London, 1853*  
The history of electricity is told in forty pages and its applications in as many more.

1249a.——*Manual of electricity, practical and theoretical.* Third edition. viii+314 pp. ill. 12mo. *London, 1859*  
Elementary manual of electricity, its history theory and application.  
—See also 5005.

1250. Breguet, L(ouis François Clément). (1804-1883.) *Manuel de la télégraphie électrique.* Seconde edition. 106 pp. ill. 2 plates. 12mo. *Paris, 1853*  
Detailed description of the electro-magnetic dial telegraph as constructed by the author.

1250a.——*Troisième édition* 107 pp. 12mo. *Paris, 1856*  
—See also 1154.

CATALOGUE OF WHEELER GIFT

1251. **De la Rive**, Aug(uste Arthur). (1801-1873.) Treatise on electricity in theory and practise. Translated by C(harles) V(incent) Walker. 3 vols. ill. 8vo. *London, 1853-1858*  
Comprehensive work on electricity and magnetism. For a long period, the only systematic practical treatise on the subject. (See No. 3076.)  
—See also 818.

1252. **Dering**, G(eorge) E(ward). Magnetism, a sketch of the history and principles of the science and its applications, including the mariner's compass and electric telegraph. 35 pp. 12mo.  
*Hertford, 1853*  
Outlines of magnetic discovery; history of the compass; remarks on *Petrus Peregrinus*. (See No. 46.)  
—See also 5026.

1253. **Dub**, (Christoph) Julius. (1817-1873.) Die Gesetze des Elektromagnetismus im weichen Eisen. 31 pp. 4to. (Programm.)  
*Berlin, 1853*  
Magnetism developed in soft iron by the electric current.  
—See also 1515, 1540.

1254. **Du Bois-Reymond**, Emil (Heinrich). (1818-1896.) On Signor Carlo Matteucci's letter to H. Bence Jones, editor of an abstract of Dr. Du Bois-Reymond's Researches in animal electricity. 41 pp. ill. 8vo.  
*London, 1853*  
Controversial paper on the nature of the frog-current. (See No. 1222.)  
—See also 1172.

1255. **Du Moncel**, Th(éodore) Achille Louis. (1821-1884.) Considérations nouvelles sur l'électro-magnétisme et ses applications aux électro-moteurs et à l'anémographie électrique. 154 pp. ill. 1 plate. 8vo.  
*Paris, 1853*  
The first pamphlet of 33 pages treats of electro-magnets and how they may be used in the construction of motors; the second of 40 pages treats of winds and mechanisms for recording their direction and velocity; the third of 70 pages treats of the mutual action of currents and magnets.  
—See also 1223.

1256. **Gintl**, Wilhelm (Friedrich). Der elektro-chemische Schreib-Apparat fuer den Telegraphen-Betrieb in Oesterreich. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl. 1853, pp. 616-626.) 8vo.  
*Vienna, 1853*  
Electro-chemical writing-telegraph devised by the author, an Austrian electrician of note.  
—See also 1284.

1257. **Gloesener**, Michael. (1794-1876.) Recherches sur la télégraphie électrique. 124 pp. 12 plates. 8vo.  
*Liège, 1853*  
Summary of the author's researches on various systems of electric telegraphs; also discussion of some problems in telegraphy.

1258.—Télégraphe à aiguille perfectionné. (Mém. Soc. Sc. Liège, Vol. 8, pp. 145-259+654-662.) 1 plate. 8vo.  
*Liège, 1853*  
The author describes the improvements which he made in telegraphic apparatus. (Autograph copy, dedicated to Dr. C. Jelinek.)  
—See also 1095.

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1259. Helmholtz, H(ermann Ludwig Ferdinand). (1821-1894.) On the conservation of force. (Translation.) (Taylor's Scient. Memoirs, 1853, pp. 114-162.) 8vo. London, 1853  
Paper of fundamental importance; physical and mathematical treatment of the subject.  
—See also 1803, 1836, 1868, 2031, 2196, 2232.

1260. Hogg, Jabez. (1817-1899.) Elements of experimental and natural philosophy, being a familiar and easy introduction to the study of the physical sciences. iv+357 pp. ill. 8vo. London, 1853  
Remarks on Galvani's experiments.

1261. (Russell, Robert W.) History of the invention of the electric telegraph; abridged from the works of Laurence Turnbull and Edward Highton, with remarks on R. E. House's American printing telegraph and the claims of S. F. B. Morse, as an inventor. 130+x pp. 12mo. New York, 1853  
Dr. Turnbull traced the history of the various kinds of electric telegraphs in the lectures on the electro-magnetic telegraph, which he published in 1852. (See No. 1271.)

1262. Kreil, Karl. (1798-1862.) Einfluss des Mondes auf die horizontale Componente der magnetischen Erdkraft. (Denkschriften Akad. Wiss. Math.-Nat. Kl., Vol. 5, pp. 35-90.) 4to. Vienna, 1853  
Tabulated observations of the moon's influence on the horizontal component of the earth's magnetic force.  
—See also 1235.

1263. Lawrence, Richard Moore. On the application and effect of electricity and galvanism in the treatment of cancerous, nervous, rheumatic and other affections. vii+101 pp. 8vo. London, 1853  
—See also 1419.

1264. Merget, (Antoine Eugène). Étude sur les travaux de M. de Romas. (Actes Acad. Bordeaux, Vol. 20, pp. 447-518.) 8vo. Bordeaux, 1853  
Detailed discussion from the view-point of priority, of Franklin's experiments on atmospheric electricity; the claims of M. de Romas, the author's countryman are sustained. See *Franklin and de Romas or the Lightning Kite* by Brother Potamian, *Electrical World*, Jan. 20, 1906.

1265. Nicklès, F(rançois) J(oseph) J(érôme). (1820-1869.) Les électro-aimants circulaires. 27 pp. 1 plate. 4to. (Thèse.) Paris, 1853  
Researches on the tractive power of electromagnets.  
—See also 1195, 1494, 3140.

1266. Ohm, G(eorg) S(imon). (1787-1854.) Grundzüge der Physik als Compendium zu seinen Vorlesungen. Part I. Allgemeine Physik. 193 pp. 8vo. Nuremberg, 1853  
Treatise on rational mechanics and hydro-mechanics by the discoverer of the fundamental law of current electricity.  
—See also 835.

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1267. **Palagi, Alessandro.** Sulle variazioni elettriche a cui vanno soggetti i corpi allorche si allontanano, o si avvicinano fra di loro. (Nuovi Ann. Sc. Nat., Bologna, Vol. 8, pp. 365-375.) 8vo. *Bologna, 1853*  
Criticism of certain conclusions drawn from the indications of a Peltier electrometer.  
—See also 1311, 1331.

1268. **Petrina, Franz (Adam).** (1799-1855.) Ueber die vortheilhafte Anwendung der Zweigstroeme bei der Telegraphie. (Sitz. Ber. Boehm. Akad. Wiss. Math.-Nat. Kl., Vol. 10, pp. 3-6.) 8vo. *Prague, 1853*  
A simple electromagnetic harmonica consisting of a series of induction-coil vibrators. (Autograph copy, dedicated to Prof. Joh. Mueller.)

1269.—Ueber eine Vereinfachung beim telegraphischen Correspondiren in grosse Entfernungen. (Sitz. Ber. Boehm. Akad. Wiss. Math.-Nat. Kl., Vol. 2, pp. 375-378.) 8vo. *Prague, 1853*  
The author's views on simplifying long-distance telegraphy.  
—See also 1066.

1270. **Rhind, W. G.** The magnet, the life of the mariner's compass. 23 pp. 2 plates. 8vo. *London, 1853*  
General phenomena of the magnet compiled chiefly from Noad's "Lectures." (See No. 1065.)

1271. **Turnbull, Laurence.** (1821-1900.) Electro-magnetic telegraph; with an historical account of its rise, progress and present condition, also practical suggestions in regard to insulation, and protection from the effects of lightning, with an appendix containing several important telegraphic decisions and laws. Second edition, revised and improved. 264 pp. ill. 2 plates. 8vo. *Philadelphia, 1853*  
Detailed history of the development of the electric telegraph with numerous illustrations. The appendix contains a brief account of important telegraph decisions. (See No. 1261.)  
—See also 1303.

1272. **Walker, William.** Magnetism of ships, and the mariner's compass, being a rudimentary exposition of the induced magnetism of iron in seagoing vessels, and its action on the compass, in different latitudes, and under diversified circumstances. xx+207 pp. 1 plate, tables, diagrs. 12mo. *London, 1853*  
History of the mariner's compass; action of the variable magnetism of iron ships on the compass; the author's compass.

1273. **Weber, Wilhelm Eduard.** (1804-1891.) On the connection of diamagnetism with magnetism and electricity. (Translation by John Tyndall.) (Scient. Memoirs, Ser. II, Vol. 1, pp. 163-199.) 8vo. *London, 1853*  
Physical and mathematical paper on the fundamental phenomena of diamagnetism.  
—See also 1110.

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1274. **Adley, Charles C(oles).** Anglo-Indian telegraphs; or communication with London, in six hours. 26 pp. 1 map. 12mo. *Calcutta, 1854*  
The overland telegraph-route to India via Belochistan.

1275.——The electric telegraph; its history, theory and practical applications. With an abstract by Charles Manby. (Extract Minutes Proc. Instit. Civil Engen., Vol. 11.) 33 pp. ill. 8vo. *London, 1854*  
—See also 1635, 3162.

1276. **Bosscha, Johannes (The younger).** De galvanometro differentiali. 62 pp. 8vo. (Inaugural dissertation.) *Leyden, 1854*  
Theory and use of the differential galvanometer.  
—See also 1348, 1444, 3052.

1277. **Boudin, (Jean Christian Marc François Joseph).** (1806-1867.) Histoire physique et médicale de la foudre et de ses effets sur l'homme, les animaux, les plantes, les édifices, les navires. 31 pp. 8vo. *Paris, 1854*  
Statistics relating to the destructive effects of lightning.  
—See also 1313.

1278. **Brown, Andrew.** Philosophy of physics; or Process of creative development by which the first principles of physics are proved beyond controversy, and their effect in the formation of all physical things made comprehensible to all intelligent minds as in phenomenal nature. 541 pp. 8vo. *New York, 1854*  
Metaphysical work containing incidentally a slight discussion of some electric and magnetic phenomena.

1279. **Clarke, E. Marmaduke.** Illustrated hand book of the Royal Panopticon of science and art. 150 pp. ill. pl. 12mo. *London, 1854*  
Popular description of some electric and magnetic experiments.

1280. **Du Bois-Reymond, (Emil Heinrich).** (1818-1896.) Ueber Stroeme die durch Andruicken feuchter Leiter an metallische Elektroden entstehen. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl. 1854, pp. 288-301). 8vo. *Berlin, 1854*  
Experiments in illustration of some of the author's views on animal electricity.  
—See also 1172.

1281. **Du Moncel, Th(éodore Achille Louis).** (1821-1884.) Théorie des éclairs. 46 pp. 8vo. *Cherbourg, 1854*  
Explanation of the various forms of lightning.  
—See also 1223.

1282. **Faraday, M(ichael).** (1791-1867.) On electric induction; associated cases of current and static effects. (Extract, Proc. Roy. Instit., Vol. 1, pp. 345-355.) 8vo. *London, 1854*  
Remarks on the "velocity" of electricity. Latimer Clark's experiments on the retardation of signals in long underground conductors.

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1282a.——Further observations on associated cases of current and static effects. (Extract, *Philos. Mag.* 1855.) 5 pp. 8vo.  
*London, 1855*  
 The observations bear on the retardation of telegraph signals in buried conductors.  
 —See also 787.

1283. **Felici, Riccardo.** Sulla teoria matematica dell' induzione elettrodinamica. (Ann. Univ. Toscana Sc. Cosm., Vol. 3, pp. 1-30+99-141, 1 plate; Vol. 4, pp. 5-24.) 4to. *Pisa, 1854-1855*  
 Mathematical theory of some important cases in electromagnetic induction.  
 —See also 1173.

1284. **Gintl, Wilhelm (Friedrich).** Der elektro-chemische Schreib-Telegraph auf die gleichzeitige Gegen-Correspondenz an einer Drahtleitung angewendet. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., Vol. 14, pp. 400-415.) ill. 8vo. *Vienna, 1854*  
 Description accompanied by diagrams of the author's electro-chemical telegraph.  
 —See also 1256.

1285. **Knochenhauer, Karl Wilhelm.** (1805-1875.) Beitraege zur Elektrizitaetslehre. iv+127 pp. 1 plate. 8vo. *Berlin, 1854*  
 Research on the nature of the discharge from Leyden batteries.  
 —See also 1234.

1286. **Lardner, Dionysius.** (1793-1859.) Museum of science and art. 12 vols. ill. 12mo. *London, 1854-1856*  
 Popular account of telegraphy and submarine cabling in its early years.  
 —See also 876.

1287. **Masson, A(ntoine Philibert).** (1806-1860.) Mémoire sur l'électricité électrique. 94 pp. 2 plates. 4to. *Harlem, 1854*  
 The spark-discharge in various media; spark-spectra of gases and metals.  
 —See also 941.

1288. **Matteucci, C(arlo).** (1811-1868.) Cours spécial sur l'induction, le magnétisme de rotation, le diamagnétisme, et sur les relations entre la force magnétique et les actions moléculaires. viii+278 pp. 2 plates. 8vo. *Paris, 1854*  
 Work containing the author's researches on magnetic rotations, electrodynamic induction, and the phenomena of diamagnetism.  
 —See also 985.

1289. **Melloni, Macedonio.** (1798-1854.) Sulla eguaglianza di velocità che le correnti elettriche di varia tensione assumono nello stesso conduttore metallico. (Ann. Sc. Mat.-Fis. Ser. I., Vol. 5, pp. 319-325.) 4to. *Rome, 1854*  
 The velocity of current transmission in a given conductor is independent of the impressed e. m. f.

1290.——Sulla induzione elettrostatica. (Ann. Sc. Mat.-Fis. Ser. I., Vol. 5, pp. 327-334.) 1 plate. 4to. *Rome, 1854*  
 Research on electrostatic induction. (See Nos. 1949, 1993, 2012, 2054.)

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1291.——Elettroscopie. (Ann. Sc. Mat.-Fis. Ser. I., Vol. 5, pp. 335-343.) 1 plate. 4to. *Rome, 1854*  
Description of the author's electroscope with diagrams.

1292.——Sopra alcuni fenomeni di elettricismo statico e dinamico recentemente osservati da Faraday nei conduttori de telegrafi sotterranei e sottomarini. (Rend. R. Accad. Sc., Napoli, Ser. II, Vol. 3, pp. 30-38.) 8vo. *Naples, 1854*  
Note on Faraday's demonstration of the "electrification" of submarine cables.

1293. Meyer, Moritz. (1821-1893.) Die Elektricitat in ihrer Anwendung auf praktische Medicin. xiii+167 pp. ill. 8vo. *Berlin, 1854*  
Work on electro-therapeutics.

1294. Pekarek, Franz. Ueber elektrische Lampen. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., Vol. 12, pp. 263-274.) 2 plates. 8vo. *Vienna, 1854*  
Arc lamps and regulating mechanisms.

1295. Pluecker, Julius. (1801-1868.) Commentatio de crystallorum et gazorum conditione magnetica. 34 pp. 4to. (Inaugural dissertation.) *Bonn, 1854*  
Dissertation on the diamagnetic properties of certain crystals and gases.  
—See also 1164.

1296. Quetelet, (Lambert) Ad(olphe Jacques). (1796-1874.) Sur l'électricité des nuages oageux. (Bull. Acad. Sc., Bruxelles, Vol. 21, pp. 6-15.) 8vo. *Brussels, 1854*  
Note on the charge and inductive effects of thunder-clouds.  
—See also 968.

1297. Robinson, T(homas) R(omney). (1792-1882.) On the luminous phenomena produced by the discharge of Ruhmkorff's induction apparatus. (Proc. Irish Acad., Vol. 6, pp. 282-290.) 8vo. *Dublin, 1854*  
Study of the discharge from an induction coil through gases and vapors at varying pressures.  
—See also 1148.

1298. Robiquet, H(enri) E(dme). (1822-1860.) Observations au sujet de la théorie de Franklin sur la nature du fluide électrique. pp. 32-46. 4to. (Thèse.) *Paris, 1854*  
The objections of Aepinus to Franklin's theory answered; theory of the electrostatic machine, the electrophorus and condenser explained according to the one and also the two-fluid theory.

1299. Rutter, J. O. N. Human electricity; the means of its development. Illustrated by experiments. With additional notes. vi+182+lxii pp. ill. 1 plate. 12mo. *London, 1854*  
A popular work. Among subjects treated are; the electricity of the human body, health and disease as affected by electricity.  
—See also 1213.

1300. Schellen, (Thomas Joseph) H(einrich). (1818-1884.) Der elektromagnetische Telegraph in den Hauptstädten seiner Ent-

wickelung und in seiner gegenwaertigen Ausbildung und Anwendung, nebst einer kurzen Einleitung ueber die optische und akustische Telegraphie und einem Anhange ueber den gegenwaertigen Betrieb der elektrischen Uhren. xii+259 pp. 1 plate. 8vo. *Brunswick, 1854*  
 Mechanical, optical and electrical telegraphs; lightning arresters, electric clocks.

1300a.—Fifth edition. (Bedeutend erweiterte und den neuesten Zu-  
 staenden des Telegraphenwesens angepasste Auflage.) x+  
 801+xxiii pp. 600 ill. 8vo. *Brunswick, 1870*  
 —See also 1069.

1301. **Schoenbein, C(hristian) F(riedrich).** (1799-1868.) Ueber die  
 chemischen Wirkungen der Elektricitat der Waerme. (Verh.  
 Naturf. Ges. Basel, Vol. 1, pp. 18-67.) 8vo. *Basle, 1854*  
 Some chemical effects of the electric current. (Autograph copy, dedicated to  
 Faraday.)  
 —See also 989.

1302. **Tate, T(homas) Turner.** (1807-1888.) Electricity for the use  
 of beginners. iv+100 pp. ill. 16mo. *London, 1854*  
 —See also 3262.

1303. **Turnbull, Laurence** (1821-1900) and **W(illiam) C. McRea.**  
 Railroad accidents, and the means by which they may be pre-  
 vented by the use of the electromagnetic safety apparatus.  
 63 pp. 12mo. *Philadelphia, 1854*  
 —See also 1271.

1304. **Willigen, V(olkert) S(imon) M(aarten) van der.** (1822-1878.)  
 Proeven betreffende den galvanischen lichtboog. 13 pp. 8vo.  
*Deventer, 1854*  
 Heat and light produced by voltaic batteries.  
 —See also 1343, 1374, 1431, 1470, 1504, 2114.

1305. **Vincent, J.** (1822-1887.) Notice sur l'établissement des lignes  
 télégraphiques en Belgique. 75 pp. 8vo. *Brussels, 1854*  
 —See also 3268.

1306. **Wallace, W(illiam) Clay.** An attempt to show that light, heat,  
 electricity, and magnetism are effects of the law of gravita-  
 tion. 15 pp. ill. 8vo. *New York, 1854*  
 The earth and the sun constitute a geoheliac battery; the earth and the moon  
 a geoselenic battery.  
 —See also 5249.

1307. **Window, Frederick Richard.** On the electric telegraph and the  
 principal improvements in its construction. With an abstract  
 by Charles Manby. (Excerpt Minutes Proc. Instit. Civil  
 Engin., Vol. 2.) 62 pp. 8vo. *London, 1854*  
 General account of electric telegraphy: the double needle instrument; Brett's  
 printing, Blakewell's copying and Siemens' printing telegraphs.  
 —See also 1402, 1474, 3073.

1308. **Orr's circle of the sciences**, a series of treatises on the prin-  
 ciples of Science. 9 vols. ill. map. 8vo. *London, 1854-1856*  
 Treatises on geometry, trigonometry, astronomy, electricity and magnetism.

Paris, you can draw a profile by ordinary means there, and the same profile draws itself at the same time at Frankfort. Attempts of this sort have succeeded. The apparatus has been exhibited at the London Exhibition. Some details, however, remain to be perfected. It would seem impossible to go beyond this in the region of the marvellous. Let us try, nevertheless, to go a few steps further. I have asked myself, for example, if the spoken word itself could not be transmitted by electricity; in a word, if what was spoken in Vienna may not be heard in Paris? The thing is practicable in this way:—

We know that sounds are made by vibrations, and are made sensible to the ear by the same vibrations, which are reproduced by the intervening medium. But the intensity of the vibrations diminishes very rapidly with the distance; so that even with the aid of speaking tubes and trumpets, it is impossible to exceed somewhat narrow limits. Suppose that a man speaks near a movable disk, sufficiently flexible to lose none of the vibrations of the voice; that this disk alternately makes and breaks the connection with a battery; you may have at a distance another disk which will simultaneously execute the same vibrations.

It need not be said that numerous applications of the highest importance will immediately arise from the transmission of speech by electricity. Any one who is not deaf and dumb may use this mode of transmission, which would require no apparatus except an electric battery, two vibrating disks and a wire. In many cases, as, for example, in large establishments, orders might be transmitted in this way, although transmission in this way will not be used while it is necessary to transmit letter by letter, and to make use of telegraphs which require use and apprenticeship. However this may be, it is certain that in a more or less distant future, speech will be transmitted by electricity. I have made some experiments in this direction. They are delicate, and demand time and patience; but the approximations obtained promise a favorable result.

CHARLES BOURSEUL.

PARIS, August 18, 1854.

1308bis. BOURSEUL. (*Translation of a portion of a communication printed in "L'Illustration," Paris, August 26, 1854.*)

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1308+bis. **Telephone—Bourseul.** Five publications relating to Charles Bourseul. The papers, written originally in foreign languages, are translated into English. *1854-1878*

1. *L'Illustration, Journal Universel*, Aug. 26, 1854. A communication from Charles Bourseul. 2. *Didaskalia, Blaetter fuer Geist, Gemuth und Publicitaet*. No. 232. Apparently an abstract of the foregoing Bourseul article. 3. *Exposé des Applications de l'Électricité*, by Du Moncel, Vol. II, p. 225, ed. 1854; Vol. III, p. 110, ed. 1856. Reprint of the body of Bourseul's communication to *L'Illustration*. 4. *Comptes Rendus des Séances de l'Académie des Sciences*, Nov. 26, 1877. Extract from paper about Bourseul and Bell, read before the Académie by Du Moncel. 5. *The Telephone, the Microphone and the Phonograph*, by Du Moncel, published in French 1878, and in English by Harper Bros., 1879, pp. 12-15.

1309. **Arago, (Dominique François Jean).** (1786-1853.) Meteorological essays with an introduction by Alexander von Humboldt, translated under the superintendence of Colonel Sabine. *xxxvi+504 pp. 8vo.* *London, 1855*  
Storehouse of facts and general information on electric and magnetic phenomena.  
—See also 915.

1310. **Becquerel, (Antoine César) (1788-1878) & ALEXANDRE E(dmond) BECQUEREL. (1820-1891.)** *Traité d'électricité et de magnétisme. Leurs applications aux sciences physiques, aux arts et à l'industrie.* 3 vols. ill. 8vo. *Paris, 1855-1856*  
The first volume treats of general principles; the second of electro-chemistry; the third of magnetism and electro-magnetism. This last volume contains numerous magnetic charts.  
—See also 882, 1439.

1311. **Bertelli, Timoteo.** (1826-1905) & Alessandro Palagi. *Sulla distribuzione delle correnti elettriche nei conduttori. Esperienze.* 25 pp. 3 plates. 8vo. *Bologna, 1855*  
Experiments on the mode of propagation of an electric current in telegraph wires.  
—See also 1267, 1441.

1312. **Bois, (François) Victor.** (1813-1870.) *La télégraphie électrique.* 127 pp. 12mo. *Paris, 1855*  
Chappe's mechanical telegraph, the electric dial-telegraph, the Morse code and other electrical generalities.

1313. **Boudin, (Jean Christian Marc François Joseph).** (1806-1867.) *De la foudre considérée au point de vue de l'histoire de la médecine légale et de l'hygiène publique.* 50 pp. 8vo. *Paris, 1855*  
Brief historical notice with numerous references: effect of lightning-stroke on the animal system.

1314.—*Histoire de la foudre et des paratonnerres.* 56 pp. ill. 8vo. The lightning-rod considered historically and practically. *Paris, 1855*  
—See also 1277.

1315. **Brewster, (Sir) David.** (1781-1868.) *The electric telegraph.* (North British Rev., Vol. 22, pp. 545-591.) 8vo. *Edinburgh, 1855*  
Consecutive account of the development of the electric telegraph: letter of

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C. M. (Charles Marshall) from the Scots Magazine, 1753. (See No. 378.)  
—See also 1197.

1316. Bright, Edward Brailsford. *Vis, a treatise on the predominating influence of the sunbeam throughout creation.* viii+161 pp. 12mo. *London, 1855*  
Solar variation and not the force of gravitation governs all cosmical phenomena. Periodic changes in magnetic declination.  
—See also 1666, 2447, 3925.

1317. Channing, William F. *The American fire-alarm telegraph: a lecture delivered before the Smithsonian Institution, March, 1855. (Reprinted from Ann. Report Smithsonian Institution, 1854, pp. 147-155.)* 19 pp. 8vo. *Boston, 1855*  
The system described is that of Moses G. Farmer.  
—See also 2958.

1318. Figuier, (Guillaume Louis). (1819-1894.) *Exposition et histoire des principales découvertes scientifiques modernes.* 4 ième edition. 4 vols. ill. 12mo. *Paris, 1855-1857*  
Vol. II contains a history of electric telegraphy; Vol. IV the lightning-rod and the voltaic battery.  
—See also 1354, 1719.

1319. Galle, L(udwig). *Katechismus der elektrischen Telegraphie.* xii+191 pp. ill. 12mo. (Weber's Katechismen, Vol. 21.) *Leipzig, 1855*  
The essentials of electric telegraphy.

1319a.——3d edition (vermehrte und verbesserte Auflage). xii+232 pp. ill. 12mo. *Leipzig, 1864*

1320. Goodyear, Charles. (1800-1860.) *Gum-elastic and its varieties, with a detailed account of its applications and uses, and of the discovery of vulcanization.* 2 vols. 8vo. *New Haven, 1855*  
The manufacture of India rubber and its various uses.

1321. Hansteen, Christopher. (1784-1873.) *Den magnetiske inclinations forandring i den nordlige tempererte zone.* 71 pp. 1 map. 4to. *Copenhagen, 1855*  
Celebrated memoir on the magnetic dip in the north-temperate zone.  
—See also 756.

1322. Horn, Hermann. *Darstellung der magnetischen Polaritäts-Verhältnisse gegenüberstehender lebender Organismen mittels der Magnethaftigkeit.* 35 pp. 8vo. *Munich, 1855*  
Magnetism of the human organism, plants, etc.

1323. Lardner, Dionysius. (1793-1859.) *Electric telegraph popularized.* From "The Museum of Science and Art." vi 1.+pp. 113-208+1-149 (250 pp.) ill. 1 plate. 12mo. *London, 1855*  
Cable laying in the early days, par. 145; Maury's telegraphic plateau, par. 169.

1324.——*Handbook of natural philosophy.* 4 vols. ill. 12mo. *London, 1855-1856*  
Manual of physical science involving a knowledge of elementary mathematics only. Vol. IV, Electricity, magnetism, and acoustics.

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1324a.——Handbook of electricity, magnetism and acoustics. Seventh thousand. Edited by G. C. Foster. xix+442 pp. ill. pl. 12mo. *London, 1866*  
Numerous and valuable additions to the original by Prof. G. Carey Foster.  
—See also 876.

1325. **Lyon**, Lucius. Treatise on lightning conductors, compiled from a work on thunderstorms by S. W. Harris and other standard authors. Second edition. xvi+240 pp. 12mo. *New York, 1855*  
Compilation principally from the works of Sir William Snow Harris and Noad.

1326. **Michaud**, L. *La terre, l'eau, l'air et le feu; ou Notions de physique, de mécanique, de chimie et de géologie en rapport avec les phénomènes naturels du globe et les usages ordinaires de la vie. Seconde partie: La terre et le feu.* 324 pp. 10 plates. 12mo. *Lausanne, 1855*  
Eighty pages of popular treatment of magnetism and electricity.

1327. **Miège**, B. & T. R. **Ungérer**. *Vade-mecum pratique de télégraphie électrique à l'usage des employés du télégraphe. Première partie. Cours élémentaire professé à l'administration centrale des lignes télégraphiques, par B. Miège. Deuxième partie: Études pratiques sur le système et appareil Morse, par T. R. Ungérer.* 2 parts. ill. 2 plates. 12mo. *Paris, 1855*  
Telegraphic essentials.

1328. **Miller**, William Allen. (1817-1870.) *Elements of chemistry; theoretical and practical. Part I. Chemical physics.* (Complete in 3 vols.) ill. 8vo. *London, 1855*  
Two hundred pages are devoted to magnetism and electricity.

1328a.——Part I. Fifth edition, revised with additions by Herbert McLeod. ill. 8vo. *London, 1872*  
—See also 2244, 3356.

1329. **Mullaly**, John. *Trip to Newfoundland; its scenery and fisheries; with an account of the laying of the submarine telegraph cable.* 108 pp. ill. 12mo. *New York, 1855*  
Narrative of the laying of the cable between Port au Basque and North Sydney, 1855; the writer was a member of the expedition. He was also on board the U. S. steam-frigate *Niagara* as secretary to Prof. Morse and afterwards to Cyrus W. Field, while the cables of 1857 and 1858 were being laid.  
—See also 1425.

1330. **Ogan**, Alfred. *Railway collisions prevented.* xx+34 pp. 5 plates. 8vo. *London, 1855*  
Electro-magnetic apparatus for operating railway signals.

1331. **Palagi**, Alessandro. *Sperienze elettro-dinamiche.* (Extract, *Giorn. Arcadico*, Vol. 140, pp. 83-94.) 14 pp. 8vo. *Rome, 1855*  
Account of experiments made by the author on a circuit consisting of copper wire and a considerable length of a railroad line.

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1331a.——(Facoltà elettro-motrice del carbone.) (Extract, Rend. Accad. Sc. Bologna, 1855-1856. pp. 62-65.) 4 pp. 8vo.  
*Bologna, (1856?)*  
 Deposition of copper from solution of copper-sulphate on incandescent charcoal.  
 —See also 1267.

1332. **Philips**, A. J. P. (pseud.) (*i. e.*, J. P. Durand). Electro-dynamisme vital; ou, les relations physiologiques de l'esprit et de la matière démontrées par des expériences entièrement nouvelles et par l'histoire raisonnée du système nerveux. *xlvii+383 pp. 8vo.*  
*Paris, 1855*  
 Investigation on the manner in which nerves and muscles are affected by the electric current.

1333. **Poggendorff**, (Johann Christian). (1796-1877.) Fortgesetzte Beobachtungen ueber Inductions-Elektricitat. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl. 1855, pp. 12-42.) 8vo. *Berlin, 1855*  
 Construction and function of the various parts of an induction coil.  
 —See also 1027.

1334. **Regnard**, Edouard. Mémoire sur la télégraphie électrique à courants combinés et à double échappement et sur l'horlogerie électrique. *46 pp. 2 plates. 8vo.*  
*Paris, 1855*  
 Application of the electric current to dial-telegraphs.

1335. **Regnauld**, Jules (Antoine). (1820-1895.) Recherches sur les forces électro-motrices et sur une nouvelle méthode propre à les déterminer. *56 pp. 1 plate. 4to. (Thèse.)* *Paris, 1855*  
 Study of the various causes that may affect the e. m. f. of a cell; a new method of determining the e. m. f. of a battery.  
 —See also 1129.

1336. **Robinson**, T(homas) R(omney). (1792-1882.) Experimental researches on the lifting power of the electro-magnet. (Trans. Roy. Irish Acad., Vol. 22, pp. 291-311+499-524; Vol. 23, pp. 501-533.) 4to.  
*Dublin, 1855-1859*  
 Experimental inquiry into the relation between the position of the turns of wire, the length of the magnetic circuit, and the lifting power of an electro-magnet.

1337.——On the relation between the temperature of metallic conductors, and their resistance to electric currents. (Trans. Roy. Irish Acad., Vol. 22, pp. 1-24.) 4to.  
*Dublin, 1855*  
 One of the principal facts established is that the resistance of a conductor to the passage of a current increases without limit up to the point of fusion.  
 —See also 1148.

1338. **Ronalds**, (Sir) Francis. (1788-1873.) Descriptions de quelques instruments météorologiques et magnétiques. *58 pp. 14 plates. 8vo.*  
*Paris, 1855*  
 Among the instruments described are a magnetograph and photo-electrograph.  
 —See also 803.

1339. **Schweigger**, J(ohann) S(alomo) C(hristoph). (1779-1857.) Ueber die optische Bedeutsamkeit des am elektromagnetischen

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Multiplikator sich darstellenden Princips zur Verstaerkung des Magnetischen Umschwungs. 37 pp. 4to. *Halle, 1855*  
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—See also 724.

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Written for beginners.

1342. **Tresca, Henri Edouard.** (1814-1885.) Visite à l'exposition universelle de Paris, en 1855. Publié avec la collaboration de MM. Alcan, Bandement, Boquillon, Delbrouckainé, Dekeraïn, Fortin, Hermann, J. Gaudry, Molinos, C. Nepreu, H. Peligot, Pronnier, Silbermann, E. Trelat, U. F. Trelat, Tresca, sous la direction de M. Tresca. 785 pp. pl. 16mo. *Paris, 1855*  
Notices of the electric light, as seen in the Paris Exposition of 1855; also of gutta percha and electro-metallurgy.  
—See also 3566.

1343. **Willigen, V(olkert) S(imon) M(aarten) van der.** (1822-1878.) Over combinatie-toonen, zoogenaande stooten en conen dissonantie. (Versl. Akad. Wetensch. Amsterdam, Vol. 3, pp. 115-146.) 8vo.  
Combination-tones and dissonance.  
—See also 1304.

1344. **Hall, C. C. van.** De electro-magnetische telegraaf in zijne verschillende trappen van ontwikkeling en tegenwoordigen toestand voorgesteld. Bevattende eene handleiding voor telegrafisten en eene duidelijke uiteenzetting van de gronden der telegraphie voor beschaafde lezers. 319 pp. ill. pl. 8vo.  
*Utrecht, 1855*  
General, practical work on the electric telegraph.

1345. Application of the theory of the conduction of electricity through solids in estimating the dimensions of submarine telegraph wires required for long distances. Compiled from the researches of Michael Faraday and William Thomson. 16 pp. 8vo.  
*London, 1855*  
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*Vienna, 1856-1858*  
The transformation of heat-energy into electricity.  
—See also 3048.

7 July 1857

My dear Sir

I am in the point of laying  
down but hasten to acknowledge  
your letter. as I said before when  
you can do any of these things I  
shall be willing to take a little  
leave at them. But how is it  
that the believers in these things  
make such a shouting out for the  
members men? Why do they not  
become members themselves and prove  
their own so-called facts as members  
men prove their facts. If they are

1353. FARADAY.

so much wiser than we often are  
as to form a new judgment when  
the latter are wrong why do they want  
to fill back upon them? Do we  
thus deserve to consider the man of  
science is a fool that they do  
nearly doubt what they wish to  
believe if they be the limiters  
of knowledge why should they want  
for that which is. There is only a  
slow drudging cart jogging along the  
common road?

Ever truly yours

John Clark Esq Mr Warday  
21

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1348. **Bosscha, J(ohannes) (The younger).** Broeve eener oplossing van een vraagstuk, betreffende de electrische telegrafie. (Versl. Akad. Wetensch. Amsterdam, Vol. 4, pp. 101-118.) 1 plate. 8vo. *Amsterdam, 1856*  
Development of the electric telegraph.  
—See also 1276.

1349. **Bourgeat, J. B.** Études sur Vincent de Beauvais, théologien, philosophe, encyclopédiste, ou, Spécimen des études théologiques, philosophiques et scientifiques au moyen âge XIII. siècle. 1210-1270. viii+231 pp. 8vo. (Thèse.) *Paris, 1856*  
Critical study of the work of Vincent of Beauvais, the Dominican encyclopedist of the thirteenth century, from a philosophical and theological standpoint. (See no. 1.)

1350. **Chalmers, Charles.** Notes for inquiry. Notes on the solar system and notes on electricity. Two tracts. 8+8 pp. ill. 8vo. *Edinburgh, 1856*  
—See also 1200.

1351. **Du Moncel, Th(éodore Achille Louis).** (1821-1884.) Exposé des applications de l'électricité. Seconde édition. Vols. 1-3, 5. ill. pls. 8vo. *Paris, 1856-1862*  
After a lengthy description of electro-magnetic apparatus, the author treats of the mechanical, physical and physiological applications that have been made of the electric current. The last volume is devoted to the progress in the applications of electricity made from 1859 to 1862.

1351a.—Third edition. (Entièrement refondue.) 5 vols. 22 plates. 8vo. *Paris, 1872-1878*  
An excellent work for reference in looking up the prior state of the electrical art.  
—See also 1223.

1352. **Ebner, (Moritz) von.** Ueber die Anwendung der Reibungs-Elektricität zum Zuenden von Sprengladungen. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., Vol. 21, pp. 85-111.) 1 plate. 4to. *Vienna, 1856*  
Application of frictional electricity to blasting.  
—See also 1612.

1353. **Faraday, Michael.** (1791-1867.) Letter to Latimer Clark on the death of Melloni, 1856; another, 1857, on spiritualistic séances. MSS. *1856-1857*  
—See also 787.

1354. **Figuier, Guillaume Louis.** (1819-1894.) Les applications nouvelles de la science à l'industrie et aux arts en 1855. iv+388 pp. 12mo. *Paris, 1856*  
Chapters on electric lighting, electrotyping, photography, etc.  
—See also 1318.

1355. **Force, Peter.** Record of auroral phenomena observed in the higher northern latitudes. 118 pp. 4to. *Washington, 1856*  
List of auroral observations prior to 1851 with place, date and remarks.

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*Standard text-book of elementary physics and meteorology.*  
 —See also 1454.

1357. **Gore, George.** *Theory and practice of electro-deposition, including every known mode of depositing metals, etc.* viii+104 pp. ill. 8vo. (*Orr's Circle of the Sciences, Vol. VIII.*) *London, 1856*  
 —See also 2030, 2283, 2356, 2408, 3022.

1358. **Harris, (Sir) William Snow.** (1792-1867.) *An experimental illustration of a general law of electrical discharge.* 2 pp. 1 plate. ill. 4to. *(London, 1856)*  
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 This treatise ranks among the best; the magnetic part is of special interest.

1359a.——*A new edition, revised with considerable additions by Robert Sabine.* vi+247 pp. ill. 12mo. *London, 1869*  
 —See also 801.

1360. **Hearder, J(onathan) N(ash).** (1809-1876.) *On a powerful modification of the static induction coil.* (*Trans. Cornwall Polyt. Soc. 1856, pp. 1-14.*) 8vo. *Cornwall, 1856*  
*Function of the condenser in induction coils.* (Autograph copy.)  
 —See also 2916.

1361. **Hughes, (David) Edward.** (1831-1900.) *Reading lessons, advanced series. Third book.* viii+430 pp. ill. 12mo. *London, 1856*  
*Chapters by Charles Vincent Walker on electricity, magnetism, and telegraphy.*  
 —See also 2006bis, 3399.

1362. **Jacobi, (Moritz) H(ermann) von.** (1801-1874.) *Description d'un télégraphe, électrique naval, établi sur la frégate à vapeur le Polkan.* (*Bull. Acad. Sc. Cl. Physico-Math. St. Petersburg, Vol. 14, pp. 145-150.*) 3 plates. 8vo. *St. Petersburg, 1856*  
 It is suggested to send signals by means of an electric bell.  
 —See also 907.

1363. **Knochenhauer, K(arl) W(ilhelm).** (1805-1875.) *Ueber die Theilung des elektrischen Stromes.* (*Sitz. Ber. Akad. Wiss. Math. Nat. Kl., Vol. 22, pp. 327-331.*) 8vo. *Vienna, 1856*  
 Note on the division of a current in multiple arc.  
 —See also 1234.

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1364. Lamont, J(ohann) von. (1805-1879.) Het magnetismus der Aarde, populair beschreven, uit het Hoogduitsch vertaald door W. F. Kaiser; met eene voorrede en een bijvoegsel, over het magnetismus der zon en maan, door F. Kayser. xvi+112 pp. 1 plate. 8vo. *Zwolle de Erven, 1856*  
Popular account of the phenomena of terrestrial magnetism.  
—See also 1049.

1365. Loomis, Elias. (1811-1889.) Recent progress of astronomy; especially in the United States. Third edition. 396 pp. ill. 8vo. *New York, 1856*  
Chapter on the application of the electric telegraph to astronomical purposes; experiments to determine the "velocity" of the electric current, p. 357.  
—See also 1917, 2866.

1366. McCallum, David. The globotype telegraph: a recording instrument by which small colored balls are released one-by-one, and made to pass over a series of inclined planes, by the force of their own gravity. 32 pp. ill. pl. 8vo. *London, 1856*  
Small colored balls electrically released are used to record the signals.

1367. Ohm, M(artin). (1792-1872.) Dreieinigkeit der Kraft; ein Beitrag zur naeheren Erkenntniss Gottes in seiner materiellen Schoepfung. Fuer die Gebildeten aller Staende, besonders auch des schoenen Geschlechts. viii+345 pp. 8vo. *Nuremberg, 1856*  
Considerations on the nature of attraction, heat, electricity and magnetism.

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The paper treats of the characteristics and periodicity as well as the origin and cause of the aurora borealis.

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Father Callan of Maynooth was among the first to construct an induction coil; the present paper describes some modifications introduced by the author.

1370. Poey, Andre. Analyse des hypotheses anciennes et modernes qui ont été émises sur les éclairs sans tonnerre par un ciel parfaitement serein ou dans le sein des nuages; accompagnée d'une description des éclairs sans tonnerre observés sous diverses latitudes et en particulier à la Havane, ainsi que d'un essai théorique sur la nature des éclairs sans tonnerre par un ciel couvert ou serein. (Extract, L'Annuaire, Soc. Météorol. de France, Vol. III.) 64 pp. 4to. *Versailles, 1856*  
Various causes of summer lightning discussed.  
—See also 1530, 3005.

1371. Schweigger, J(ohann) S(alomo) C(hristoph). (1779-1857.) Ueber Magnetismus in akustischer Beziehung. (Abh. Naturf. Ges., Halle, Vol. 3, pp. 145-190). 4to. *Halle, 1856*  
Velocity of propagation of light, sound and certain electro-magnetic disturbances.  
—See also 724.

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 —See also 1607, 3365.

1373. **Stark**, J. B. *Eine neue Methode des Doppeltsprechens in derselben Richtung auf einem Drahte.* (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., Vol. 20, pp. 531-538.) 1 plate. 8vo. *Vienna, 1856*  
 Paper on duplex telephony.

1374. **Willigen** V(olkert) S(imon) M(aarten) van der. (1822-1878.) *Over het in lagen verdeelde licht in het electrisch ei.* (Versl. Akad. Wetensch., Amsterdam, Vol. 4, pp. 280-286.) 8vo. *Amsterdam, 1856*  
 Experiments with the electric egg.  
 —See also 1304.

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 —See also 1658, 1765, 2750.

1377. **Allan**, Thomas. *Ocean telegraphy.* 26 pp. 12mo. *London, 1857*  
 The author's system of light cables for submarine telegraphy; telegraphic communication with America.

1377a. ——(Another edition.) 24 pp. 8vo. *London, 1860*  
 —See also 1402bis, 1435bis, 1476, 3279.

1378. **Andrew**, (Sir) W(illiam) P(atrick). (? -1887.) *Memoir on the Euphrates valley route to India; with official correspondence and maps.* xvi+267 pp. 2 maps. 8vo. *London, 1857*  
 This work was written to show the importance of establishing telegraphic communication between England and India via the Euphrates Valley.

1379. **Barrister**, A. (pseud.). *Euphrates versus Suez, or which is the shorter?; being a reply to a Quarterly Reviewer, of the Suez and Euphrates routes to India.* 32 pp. 8vo. *London, 1857*  
 The overland route is recommended.

1380. **Benedikt**, Moritz. *Ueber die Abhaengigkeit des elektrischen Leitungswiderstandes von der Groesse and Dauer des Stromes.* (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., Vol. 25, pp. 589-599.) 8vo. *Vienna, 1857*  
 Note on the strength and duration of electric currents.

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1381. **Blavier, E(douard) E(rnest).** (1826-1887.) *Cours théorique et pratique de télégraphie électrique.* 467 pp. ill. 5 plates. 12mo. *Paris, 1857*  
A standard manual of electric telegraphy.

1381a.——*Nouveau traité de télégraphie électrique.* 2 vols. ill. 8vo. *Paris, 1865-1867*  
Fundamental principles, methods and instruments fully explained. A short history of telegraphy is given in the introduction.  
—See also 1818, 2226, 3431.

1382. **Bonel, A.** *Histoire de la télégraphie, description des principaux appareils aériens et électriques.* 147 pp. ill. 12mo. *Paris, 1857*  
Short sketch of mechanical (semaphore) telegraphs, together with the rudiments of electric telegraphy.  
—See also 2270.

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Work on electrical decomposition.

1384. **(Cooke, (Sir) William Fothergill.)** (1806-1879.) *Memories of the past.* 155 pp. 4to. *(London, 1857)*  
Some poetic effusions.  
—See also 1011.

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The author describes experiments on the separation of copper from its ores by electricity; electro-vegetation; perforation of dielectrics, etc.

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Early observations; Franklin's experiments and those of de Romas; sheet lightning; ball lightning.

1388.——*Ruhmkorff's Induktions-Apparat und die damit anzustellenden Versuche; nach dem franzoesischen Original bearbeitet von C. Bromeis und J. F. Bockelmann.* vi+176 pp. ill. 8vo. *Frankfort, 1857*  
Construction and uses of the induction coil.  
—See also 1223.

1389. **Field, Cyrus W(est).** (1819-1892.) *(Correspondence on the Atlantic telegraph.)* 5 pp. 8vo. *Washington, 1857*  
Deep-sea sounding; the "telegraphic plateau."  
—See also 3021.

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1390. **Gavarret**, (Louis Dominique) J(ules). (1809-1890.) *Traité d'électricité.* 2 vols. ill. 12mo. *Paris, 1857-1858*  
The second volume has 60 pages on atmospheric electricity; Franklin's experiments, p. 538; lightning conductors, p. 588.  
—See also 1042.

1391. **Hancock**, Thomas. Personal narrative of the origin and progress of the caoutchouc or India-rubber manufacture in England. To which is added some account of the plants from which caoutchouc is obtained, its chemical analysis, statistical tables etc., with an appendix, containing the specifications of the author's patents. viii+283 pp. ill. 19 plates, portr. 8vo.  
*London, 1857*  
Mainly an account of the author's own work in the manufacture of caoutchouc.

1392. **Henry**, J(oseph). (1797-1878.) The electro-magnetic telegraph. (Proc. Board of Regents, Smithsonian Instit., 1857.) 39 pp. 8vo.  
*Washington, 1857*  
Morse's charges against the author with appendix on the history of the electro-magnetic telegraph.  
—See also 1002.

1393. **Higginson**, Francis. The ocean, its unfathomable depths and natural phenomena; comprising authentic narratives and strange reminiscences of enterprise, delusion, and delinquency: with the voyage and discoveries of Her Majesty's Ship "Cyclops." x+202 pp. 8vo.  
*London, 1857*  
Criticism of Lieutenant Maury's soundings; the author holds that a cable could not sink down to the ocean floor, p. 15; and that a range of high submarine mountains exists along the proposed cable route, p. 25.

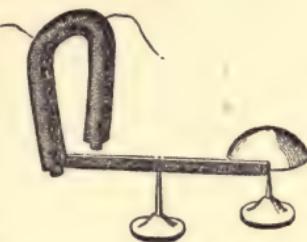
1394. **Jacobi**, (Moritz) H(ermann) von. (1801-1874.) Sur la nécessité d'exprimer la force des courants électriques et la résistance des circuits en unités reconnues. 35 pp. 8vo.  
*St. Petersburg, 1857*  
General and special considerations for the adoption of a common system of electric units; also remarks on Gaugain's galvanometer and doubts concerning the accuracy of Ohm's law.  
—See also 907.

1395. **Lardner**, Dionysius. (1793-1859.) Natural philosophy for schools. Second edition, xiv+241 pp. ill. 1 plate. 12mo.  
*London, 1857*  
The elements of the subject; a work popular in its day.  
—See also 876.

1396. (Mann, Robert James.) (1817-1886.) The Atlantic telegraph. A history of preliminary experimental proceedings and a descriptive account of the present state and prospects of the undertaking. 69 pp. 1 map. 8vo. Published by order of the Directors of the Company.  
*London, 1857*  
Mechanical and electrical difficulties of making, laying and working a cable under the Atlantic; remarks on Maury's telegraphic plateau; induction coil used in transmitting signals through cables, p. 62.  
—See also 3789.

the machine described in Silliman's Journal, vol. xx, 1831, and for the purpose of experimenting in regard to the second, I arranged around one of the upper rooms in the Albany Academy a wire of more than a mile in length, through which I was enabled to make signals by sounding a bell, (fig. 7.) The mechanical arrangement for effecting this object was simply a steel bar, permanently magnetized, of about ten inches in length, supported on a pivot, and placed with its north end between the two arms of a horse-shoe magnet. When the latter was excited by the current, the end of the bar thus placed was attracted by one arm of the horse-shoe, and repelled by the other, and was thus caused to move in a horizontal plane and its further extremity to strike a bell suitably adjusted.

Fig. 7.



This arrangement is that which is alluded to in Professor Hall's letter\* as having been exhibited to him in 1832. It was not, however, at that time connected with the long wire above mentioned, but with a shorter one put up around the room for exhibition.

At the time of giving my testimony, I was uncertain as to when I had first exhibited this contrivance, but have since definitely settled the fact by the testimony of Hall and others that it was before I left Albany, and abundant evidence can be brought to show that previous to my going to Princeton in November, 1832, my mind was much occupied with the subject of the telegraph, and that I introduced it in my course of instruction to the Senior class in the Academy. I should state, however, that the arrangement that I have described was merely a temporary one, and that I had no idea at the time of abandoning my researches for the practical application of the telegraph. Indeed, my experiments on the transmission of power to a distance were superseded by the investigation of the remarkable phenomena, which I had discovered in the course of these experiments, of the induction of a current in a long wire on itself, and of which I made the first mention in a paper in Silliman's Journal in 1832, vol. xxii.

I also devised a method of breaking a circuit, and thereby causing a large weight to fall. It was intended to illustrate the practicability of calling into action a great power at a distance capable of producing me-

\* See the Report of the Committee, page 96, and Proceedings of the Albany Institute, January, 1858.

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1397. **Swan**, William. On errors caused by imperfect inversion of the magnet, in observations of magnetic declination. (Trans. Roy. Soc. Edinburgh, Vol. 21, pp. 349-358.) 1 plate. 4to.  
*Edinburgh, 1857*  
 Formulae for calculating the error due to imperfect inversion of a declinometer magnet.

1398. **Thury**, (Jean Marc Antoine). Recherches sur l'éclairage électrique. (Extract, Biblioth. Univers., Ser. IV, Vol. 36.) 14 pp. 1 plate. 8vo.  
*Geneva, 1857*  
 Electric light from primary batteries.

1399. **Volpicelli**, Paolo. (1804-1879.) Sulla elettrostatica induzione. iv. comunicazione (Atti Accad. Pont. Nuovi Lincei, Vol. 10, pp. 280-310.) 1 plate. 4to.  
*Rome, 1857*  
 Experiments in support of the theory of free and bound charges in electrostatics.  
 —See also 1432, 1536, 1560, 1587, 1788, 1812, 1986, 2012, 2053, 2115, 3155.

1400. **Weber**, W(ilhelm Eduard) (1804-1891) and R(udolph Hermann Arndt) **Kohlrausch**. (1809-1858.) Elektrodynamische Maasbestimmungen, insbesondere Zurueckfuehrung der Strom-intensitaets-Messungen auf mechanisches Mass. (Abh. Saechs. Ges. Wiss. Math.-Nat. Kl. Vol. 3, pp. 221-292.) L. 8vo.  
*Leipzig, 1857*  
 Absolute measurement of current-strength.  
 —See also 1110, 2964.

1401. **Whitehouse**, (Edward Orange) W(ildman). Experiments on the retardation of electric signals, observed in submarine conductors. (Reprinted from the Engineer, Vol. 3, pp. 62-64). 7 pp. ill. 4to.  
*(London, 1857)*  
 Law of "square of length" as applied to the retardation of signals. Manuscript note on the above pamphlet by Latimer Clark.  
 —See also 1433, 3709.

1402. **Window**, Frederick Richard. On submarine electric telegraphs. With an abstract by Charles Manby. (Excerpt Minutes Proc. Instit. Civil Engin., Vol. 16.) 40 pp. 8vo.  
*London, 1857*  
 Review and discussion of results, principally from an engineering point of view.  
 —See also 1307.

1402bis. **Allan**, Thomas. Allan's systems of inland and submarine telegraphy. 79 pp. 8vo.  
*London, (1858)*  
 Short communications to various papers on telegraphic matters from 1853-1858.

1402bis a.—(Another edition.) 41 pp. 8vo.  
*London, 1858*  
 —See also 1377.

1403. **D'Avezac (-Macaya)**, (Marie Armand Pascal). (1799-1875). Anciens témoignages historiques relatifs à la boussole. 11 pp. 8vo.  
*Paris, 1858*  
 Quotations from Guyot de Provins, Abbot Neckam and other ancient writers on the mariner's compass.  
 —See also 1478.

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1404. (Bain, Alexander.) (1818-1877.) Natural philosophy; electricity. 105 pp. ill. 12mo. (Chambers's educational course.) *London, 1858*  
 An electrical primer attributed to Alexander Bain.  
 —See also 995.

1405. Baudouin, F(elix) M(arie). Observations sur le mode d'établissement des lignes télégraphiques sous-marins. 31 pp. 8vo. *Paris, 1858*  
 Construction and submergence of cables.

1406. Becquerel, (Antoine César) (1788-1878) and A(lexandre) E(dmond) Becquerel. (1820-1891.) Résumé de l'histoire de l'électricité et du magnétisme et des applications de ces sciences à la chimie, aux sciences naturelles et aux arts. xvi+300 pp. 8vo. *Paris, 1858*  
 Each chapter is followed by the *bibliography* of the subject treated.  
 —See also 882, 1439.

1407. Bellavitis, Giusto. (1803-1880.) Sperienze fatte per verificare se vi possono essere in un medesimo conduttore correnti elettriche simultanee ed opposte. (Atti Accad. Veneto Sc., 1857-1858, pp. 147-154.) 8vo. *Venice, 1858*  
 Note on the co-existence of two oppositely-directed currents in the same conductor.

1408.——Sulle correnti elettriche simultanee ed opposte lungo uno stesso conduttore; sopra una nuova maniera per trasmettere contemporaneamente due dispacci in direzioni opposte mediante un solo filo telegrafico; e sopra un facile modo applicare l'apparecchio telegrafico alla notazione delle osservazioni astronomiche. (Atti Accad. Veneto Sc., 1857-1858, pp. 113-125.) 8vo. *Venice, 1858*  
 Note on the principle of duplex telegraphy.

1409. Berdan, H. (Letter concerning improved apparatus for laying telegraph cables.) 10 pp. 8vo. *New York, 1858*

1410. Blaserna, Pietro. Ueber den induciren Strom der Nebenbatterie. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., Vol. 32, pp. 25-68.) 4to. *Vienna, 1858*  
 Inductive effects in multiple circuits.  
 —See also 1442.

1411. (Brett, John Watkins.) (1805-1863) On the origin and progress of the oceanic electric telegraph, with a few brief facts and opinions of the press. 104 pp. 8vo. *London, 1858*  
 History of the author's pioneer efforts in submarine telegraphy with original documents.

1411a.——On the origin and progress of Brett's submarine and subterranean electric telegraph; with a few brief facts and the opinions of the press. 175 pp. 8vo. *London, (1858)*  
 —See also 3053.

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1412. **Briggs**, Charles F(rederic) (1804-1877) & Augustus **Maverick**. Story of the telegraph and a history of the Great Atlantic Cable; a complete record of the inception, progress, and final success of that undertaking. A general history of land and oceanic telegraphs. Descriptions of telegraphic apparatus, and biographical sketches of the principal persons connected with the great work. 255 pp. ill. map. portr. 12mo. *New York, 1858*  
The finance, science, and history of the cable of 1858.

1413. **Chalmers**, Charles. Electro-chemistry, with positive results, and notes for inquiry on the sciences of geology and astronomy; with a tract of miscellanies. 100 pp. ill. 8vo. *London, 1858*  
Inquiry into the nature of the two kinds of electricity; charged ions, p. 3, close approach to the *electronic* theory, p. 14.  
—See also 1200.

1414. **Delamarche**, A. Éléments de télégraphie sous-marine, première partie: Études générales; route à suivre; construction du câble, difficultés électriques; construction du câble, difficultés mécaniques; émission du câble. Deuxième partie; Pose du câble transatlantique entre l'Irlande et Terre-Neuve. viii+80 pp. 8vo. *Paris, 1858*  
Electrical and mechanical requirements of a submarine cable and manner of laying it. The author was on board the U. S. steam-frigate *Niagara* while engaged in laying out a section of the first Atlantic cable.

1415. **Du Moncel**, Th(éodore Achille Louis). (1821-1884.) Étude du magnétisme et de l'électro-magnétisme au point de vue de la construction des électro-aimants. 268 pp. ill. 1 plate. 8vo. *Paris, 1858*  
Describes various magnetic theories and discusses the development of magnetism in electro-magnets with respect to their shape, massiveness and strength of current; also the law of distance; the book embodies the results of much original work.  
—See also 1223.

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Standard work containing a mathematical and experimental treatment of the phenomena and laws of magnetism and electricity.  
—See also 3947.

1417. **Kane**, Elisha Kent. (1822-1857.) Magnetical observations in the Arctic Seas made during the second Grinnell expedition in search of Sir John Franklin in 1853, 1854, and 1855, at Van Rensselaer harbor and other points on the west coast of Greenland. Reduced and discussed by Charles A. Schott. 66 pp. pl. 4to. (Smithsonian Contributions to Knowledge.) *Washington, 1858*  
Magnetic elements and their changes: polar aurorae.

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1418. **Laming, Richard.** New view of electrical action based upon the assumption that electricity is the only ponderable element in nature; in a series of arithmetical essays. 94 pp. 12mo. *London, 1858-1859*  
The new views are based on the assumption that electricity is the only element in nature having weight.  
—See also 961.

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—See also 1263.

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Paper of theoretical and practical magnetic interest.  
—See also 1023.

1421. **Longbridge, J(ames) A(tkinson) & C. H. Brooks.** On the submerging of telegraphic cables. 43 pp. 8vo. (Instit. Civil Engin.) *London, 1858*  
Mathematical discussion.

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Physiological effects of electricity; electric fishes.  
—See also 985.

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Phenomena of Geissler tubes: stratification of the discharge; influence of a magnetic field.

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—See also 1329.

1426. **Neumann, (Carl Gottfried).** Explicare tentatur quomodo fiat ut lucis planum polarizationis per vires electricas vel magneticas declinetur. 13 pp. 4to. (Inaugural dissertation.) *Halle, 1858*  
Action of a magnetic field on the plane of polarization: mathematical treatment.  
—See also 1727.

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1427. **Plana**, Giovanni Antonio Amedeo. (1781-1864.) Mémoire sur l'application du principe de l'équilibre magnétique à la détermination du mouvement qu'une plaque horizontale de cuivre, tournant uniformement sur elle-même imprimé par réaction ou à une aiguille aimantée assujettie à lui démeurer parallèle; ou à une aiguille d'inclinaison mobile dans un plan vertical fixe. (Mem. Accad. Torino, Ser. II, Vol. 17, pp. 101-197.) 4to. *Turin, 1858*  
Currents induced by a magnet in a rotating copper disc: mathematical paper.  
—See also 1084.

1428. **Rowett**, William. The new submarine telegraph cable; the regulation of its specific gravity and its true construction and submersion explained, showing its easy adaptation to deep sea as well as to shallow waters, and at a great diminution of expense. 43 pp. 8vo. *London, 1858*  
Ocean currents and density of sea-water; difficulties of laying cables, specific gravity of cable.  
—See also 1621.

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1430. **Soret**, (Jacques) L(ouis). (1827-1890.) Recherches sur la corrélation de l'électricité dynamique et des autres forces physiques. 88 pp. 2 plates. 4to. *Geneva, 1858*  
Considerations on the heat-equivalent of the work both external and internal, done by the electric current.  
—See also 3420.

1431. **Willigen**, V(olkert) S(imon) M(aarten) van der. (1822-1878.) Over het electrisch spectrum. (Versl. Akad. Wetensch. Amsterdam, Vols. 7 & 8.) 14+6+20+20+8+7 pp. 8vo. *Amsterdam, 1858-1859*  
Researches on the spectrum of the electric light.  
—See also 1304.

1432. **Volpicelli**, P(aolo). (1804-1879.) Sugli elettrometri. (Atti Accad. Nuovi Lincei, Vol. xl, pp. 37-54+114-124+253-264+311-317+423-431.) 4to. *Rome, 1858*  
Description and theory of various electroscopes.  
—See also 1399.

1433. **Whitehouse**, Edward Orange Wildman. The Atlantic telegraph, the rise, progress, and development of its electrical department. 28 pp. 8vo. *London, 1858*  
Introduction of gutta-percha, effect of induction, cable troubles.  
—See also 1401.

1434. "Atlanticus." Plans for depositing the electric telegraph on the bed of the Atlantic Ocean. 13 pp. pl. 8vo. *London, 1858*  
The plan necessitates eight steamboats in attendance on the ship that carries the cable.

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The Atlantic plateau and laying of the first Atlantic cable.

1435bis. Allan, Thomas. Allan's system of national telegraphic communications. 56 pp. 8vo. London, (1859)  
A series of letters written to different public men in 1858 on sub-oceanic telegraphy.  
—See also 1377.

1436. Bache, A(lexander) D(allas). (1806-1867.) Discussion of magnetic and meteorological observations. (1840-1845.) 12 parts. 20+26+14+76+70+41 pp. 4to. (Smithsonian Contributions to Knowledge.) Washington, 1859-1864  
The observations were made at Girard College, Philadelphia, in coöperation with a plan of work adopted by British colonial observatories; discussion of the *decennial period*.  
—See also 2700.

1437. Bacon, Roger. (1214-1294.) Opera quaedam hactenus inedita. Published by the authority of the Lords commissioners of Her Majesty's treasury, under the direction of the master of the rolls. Vol. I. (all published). (Halftitle:) Rerum britannicarum medii aevi scriptores, or, Chronicles and memorials of Great Britain and Ireland during the Middle Ages. cii+573 pp. 8vo. London, 1859  
This volume contains the *Opus Tertium*, *Opus Minus* and *Compendium Philosophiae*; valuable preface by Professor Brewer. References to *Petrus Peregrinus*, pp. 35, 43, 46 (see also No. 46); also to the magnet, p. 537.  
—See also 280.

1438. Beardmore, Septimus. The Globe Telegraph: an essay on the use of the earth for the transmission of electric signals. 47 pp. 8vo. London, (1859)  
Working current derived from plates of copper and zinc buried in the earth at the ends of a telegraph line.  
—See also 1481.

1439. Becquerel, (Alexandre) E(dmond). (1820-1891.) Recherches sur divers effets lumineux qui résultent de l'action de la lumière sur les corps; premier, deuxième et troisième mémoires. 5 plates. 8vo. Paris, 1859  
Researches on phosphorescence, the author's phosphoroscope.

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Electric effects due to the contact of land and water.  
—See also 1112, 1310, 1406, 2927.

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Self-registering apparatus for a meteorological station.  
—See also 1311, 1711, 1792, 3717.

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Inductive effects in neighboring circuits.  
—See also 1410, 1779, 2157.

1443. **Boncompagni, (also Buoncompagni) (Ludovisi) Baldassare.** (1821-1894.) Intorno ad un'opera di Ristoro d'Arezzo. Pubblicata dal E. Narducci. 8 pp. 4to. Rome, 1859  
This tract of Ristoro d'Arezzo, said to have been written in 1282, contains a distinct reference, p. 7, to the use of the magnet for navigating purposes.  
—See also 1094.

1444. **Bosscha, J(ohannes) (The younger).** Over eene algemeene eigenschap der lineaire verdeeling van galvanische stroomen. (Versl. Akad. Wetensch. Amsterdam, Vol. 9, pp. 53-58.) 8vo. Amsterdam, 1859  
Division of the electric current.

1445.——Over de bepaling van het mechanisch aequivalent der warmte door galvanische metingen. (Versl. Akad. Wetensch. Amsterdam, Vol. 9, pp. 59-68.) 8vo. Amsterdam, 1859  
Electric determination of the mechanical equivalent of heat.  
—See also 1276.

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Inquiry into the best conditions for laying submarine cables.

1447. **Castro, Manuel Fernandez de.** (1825-1895.) L'électricité et les chemins de fer, description et examen de tous les systèmes proposés pour éviter les accidents sur les chemins de fer au moyen de l'électricité, précédés d'un résumé historique élémentaire de cette science et de ses principales applications. 2 vols. ill. tab. 8vo. Paris, 1859  
Electric signalling and the prevention of railway accidents.

1448. **Cox, Homersham.** Submergence of telegraph cables. (Civil Engin. & Archit. Journ. Vol. 22, pp. 317-321.) 4to. London, 1859  
Incidents that occurred while laying the Atlantic Cable; log of the *Agamemnon*. Also note on the stratified discharge by John Peter Gassiot.

1449. **Deffand, (Marie de Vichy Chamroud) du.** (1697-1780.) Correspondance inédite de Mme. du Deffand; précédée d'une notice par le marquis de Sainte-Aulaire. 2 vols. 8vo. Paris, 1859  
Early reference to an electric dial-telegraph.

1450. **De la Rive, (Auguste Arthur).** (1801-1873.) Rapport sur les travaux de la Société de Physique et d'Histoire Naturelle de

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Genève de Juillet 1858 à Juin 1859. (Mém. Soc. Phys. d'Hist. Nat. Genève, Vol. 15, pp. 233-257.) 4to. *Geneva, 1859*  
References to Volpicelli's work on induction; also the author's experiments on electrical discharge in rarefied media.  
—See also 818.

1451. **Dickson, John.** Unity of the physical sciences; being an inquiry into the causes of gravitation and polarity, with an application of the results to some of the principal phenomena in each of the physical sciences. viii+87 pp. 8vo.  
*London, 1859*  
*Undulating* polarity is the cause of electricity; *constant* polarity produces magnetism.

1452. **Du Moncel, Théodore Achille Louis.** (1821-1884.) Notice sur l'appareil d'induction électrique de Ruhmkorff suivie d'un mémoire sur les courants induits. Fourth edition. x+400 pp. ill. 8vo.  
*Paris, 1859*  
Experimental examination of the nature of the induced current.

1452a. — Fifth edition. xii+400 pp. ill. 8vo. *Paris, 1867*

1453. — Revue des applications de l'électricité en 1857 et 1858. 592 pp. 3 plates. 8vo.  
*Paris, 1859*  
Supplement to the author's work in three volumes on the industrial applications of electricity covering the period 1857-1858; it treats of batteries, writing telegraphs, electric clocks, electric lamps, lightning-arresters.  
—See also 1223.

1454. **Ganot, A(dolphe).** (1804-1887.) Cours de physique expérimentale et sans mathématiques à l'usage des gens du monde. 530 pp. ill. 8vo.  
*Paris, 1859*  
The author's well known popular class-book on natural philosophy.

1454a. — (English translation.) Elementary treatise on physics, experimental and applied. Translated by E. Atkinson. Second edition, revised and enlarged. vii+799 pp. ill. pl. 8vo.  
*London, 1867*  
—See also 1356.

1455. **Gassiot, J(ohn) P(eter).** (1797-1877.) On the stratified electrical discharge as affected by a movable glass ball. (Civil Engin. & Archit. Jour. Vol. 22, p. 322.) 4to. *London, 1859*  
Stratifications in a carbonic acid tube well developed at negative terminals, but indistinct and intermingled towards the positive end.  
—See also 1641, 2819.

1456. **Grenet.** — Notice sur la pile électrique de M. Grenet dans les applications chirurgicales et sur les opérations que l'on peut faire avec cet instrument. Suivie de la description de son anse coupante à température constante. 39 pp. ill. 8vo.  
*Paris, 1859*  
The battery referred to is of the bichromate of potash type.

1457. **Hamel, (Joseph).** (1788-1862.) Historical account of the introduction of the galvanic and electro-magnetic telegraph into

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England with comments thereon by W(illiam) F(othergill) Cooke. 79+xv. pp. 12mo. *London, 1859*  
 Chronological data about the electrical work of Soemmering, Schilling, Zamboni and Romagnosi; short account of the introduction of the electric telegraph into England by Cooke and Wheatstone.  
 —See also 3186.

1458. **Hansteen**, (Christopher). (1784-1873.) *Réduction des observations magnétiques de (Alexandre) E(dmond) Quetelet* (Bull. Acad. Sc., Belgique, N. S. Vol. 8, pp. 314-322.) 8vo. *Brussels, 1859*  
 Determination of the horizontal magnetic component at Brussels.  
 —See also 756.

1459. **Herschel**, (Sir) J(ohn) F(rederick) W(illiam) (1791-1871) & R(obert) **Main**. (1808-1878.) A manual of scientific enquiry; prepared for the use of Her Majesty's Navy and adapted for travellers in general. Third edition superintended by R(obert) Main. xviii+429 pp. pl. 12mo. *London, 1859*  
 Articles on astronomy by Prof. Airy; tides by Prof. Whewell; terrestrial magnetism by Major-General Sabine, and earthquake phenomena by Robert Mallet.  
 —See also 2578.

1460. **Lobb**, Harry William. On the curative treatment of paralysis and neuralgia and other affections of the nervous system with the aid of galvanism. Second edition. viii+152 pp. ill. 12mo. *London, 1859*

1461. **Maury**, M(atthew) F(ontaine). (1806-1873). Physical geography of the sea. New edition. xxiv+352 pp. 13 charts. 12mo. *London, 1859*  
 This edition contains a chapter on the laying of the Atlantic cable.  
 —See also 4542.

1462. **Narducci**, Enrico. (1832-1893.) *La composizione del mondo di Ristoro d'Arezzo* testo Italiano del 1282. lxxxiii+384 pp. 8vo. *Rome, 1859*  
 Early reference by Ristoro d'Arezzo to the mariner's compass, p. 10.

1463. **Noad**, Henry M(inchin). (1815-1877.) Manual of electricity, including galvanism, magnetism, diamagnetism, electro-dynamics, magneto-electricity, and the electric telegraph. Fourth edition. iv+910 pp. ill. 8vo. *London, 1859*  
 Extensive experimental treatment of the subject, preceded by a brief historical sketch; first edition 1855. (See No. 5526.)  
 —See also 1065.

1464. **Reitlinger**, Edmund. (1830?-1882.) *Ueber fluessige Isolatoren der Elektricitaet*. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., Vol. 35, pp. 73-104.) 8vo. *Vienna, 1859*  
 Paper on the use of certain liquids as insulators.  
 —See also 1498, 1553, 1582, 3360.

1465. **Rowell**, G(eorge) A(ugustus). *Essay on the cause of rain and its allied phenomena*. viii+166 pp. 1 plate. 8vo. *Oxford, 1859*  
 Interesting matter on the various phenomena of electric storms: the author's

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theory, p. 17; Beccaria's experiments, p. 30; extracts from Beccaria's work on atmospheric electricity, p. 408. (See No. 375.)  
—See also 1500, 1955, 2254, 2389, 3738.

1466. **Scoresby, W(illiam).** (1789-1857.) *Journal of a voyage to Australia and round the world, for magnetical research; edited by Archibald Smith.* xlviii+96+315 pp., map, portr., tab. diagrs. 8vo. *London, 1859*  
In the introduction, Mr. Archibald Smith gives a brief history of the deviation of the compass and discusses the methods in use for its correction. This is followed by Scoresby's exposition of the disturbance which the compass experiences in iron ships.  
—See also 805.

1467. **Shaffner, Tal(iaferro) P(reston).** (1818-1881.) *Telegraph manual, a complete history and description of the semaphoric, electric and magnetic telegraphs of Europe, Asia, Africa and America ancient and modern.* 850 pp. ill. 10 portraits. 8vo. *New York, 1859*  
Includes detailed description of the laying of the first Atlantic cable.  
—See also 3206.

1468. **Sonntag, August.** *Observations on terrestrial magnetism in Mexico. With notes and illustrations of an examination of the volcano Popocatepetl and its vicinity.* 84 pp. 1 plate. 4to. (Smithsonian Contributions to Knowledge.) *Washington, 1859*  
The magnetical observations were made by Mr. Sonntag, with a set of instruments furnished by the Smithsonian Institution to Baron von Mueller.  
—See also 3139.

1469. **Tomlinson, Charles.** (1808-1897.) *The thunderstorm; an account of the properties of lightning and of the atmospheric electricity in various parts of the world.* xii+348 pp. ill. 12mo. *London, (1859)*  
Work replete with facts and information; magnetic effects of lightning, p. 71; aurora borealis, p. 303.  
—See also 948.

1470. **Willigen, V(olkert) S(imon) M(aarten) van der.** (1822-1878.) *Over de kleur einer blaauw aangeloopen stalen veér in gepolariseerd licht.* (Versl. Akad. Wetensch., Amsterdam. Vol. 9, pp. 257-264.) 8vo. *Amsterdam, 1859*  
Brief statement of the properties of polarized light.  
—See also 1304.

1471. **Rees, R(ichard) van.** (1797-1875.) *Ober de zijdelingsche ontlading der electriciteit.* (Extract, Versl. Akad. Wetensch., Amsterdam, Vol. 9.) 10 pp. 8vo. *Amsterdam, 1859*  
The Leyden jar discharge.  
—See also 3153.

1472. **(West, Charles.)** (1816-1898.) *The story of my life; by the submarine telegraph.* 96 pp. 8vo. *London, 1859*  
Humorous production containing many curious facts.  
—See also 3271.

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1473. **Wilson, George.** (1818-1859). Progress of the telegraph. 60 pp. 12mo. Cambridge, 1859  
Lecture of literary merit on the electric telegraph.  
—See also 1244.

1474. **Window, F(rederick) R(ichard).** The Atlantic and South Atlantic telegraphs. 32 pp. 8vo. London, 1859  
Some causes of the failure of the 1858 cable; construction and submergence of the cable.  
—See also 1307.

1475. **Zantedeschi, Francesco.** (1797-1873.) L'elettromagnetismo rivendicato a Giandomenico Romagnosi, e all'Italia. (Extract Corrisp. Scient. V, Roma 1859, pp. 245-250.) 16 pp. 8vo. Trent, 1859  
Vindication of the claim of Romagnosi to the discovery in 1802 of the magnetic action of a battery current.  
—See also 950.

1476. **Allan, Thomas.** Allan's systems of cheap telegraphy. 12-17 pp. 12mo. London, 1860-1861  
Government ownership of telegraphs; telegraphic reform.  
—See also 1377.

1477. **Ansted, D(avid) T(homas).** (1814-1880.) The bottom of the Atlantic and the first laying of the electric telegraph cable. 24 pp. 8vo. Guernsey, 1860

1478. **D'Avezac (-Macaya, Marie Armand Pascal.)** (1799-1875.) Aperçus historiques sur la boussole et ses applications à l'étude des phénomènes du magnétisme terrestre. (Bull. Soc. Géograph. Vol. 19, pp. 346-361.) 8vo. Paris, 1860  
Magnetic discoveries of *Petrus Peregrinus*.  
—See also 1403.

1479. **Babinet, (Jacques.)** (1794-1872.) Études et lectures sur les sciences d'observation et leurs applications pratiques. Vol. vi. 16mo. Paris, 1860  
These studies contain a paper of considerable literary merit on terrestrial magnetism. (Complete in 7 vols., 1855-1863.)

1480. **Baxter, H(enry) F(orster).** On organic polarity; shewing a connection to exist between organic forces and ordinary polar forces. viii-187 pp. 12mo. London, 1860  
Electricity is said to be due to animal and vegetable life.  
—See also 2955.

1481. **Beardmore, Septimus.** Terra-voltaism as applied to submarine telegraphs. 51 pp. 12mo. London, 1860  
A "terra-voltaic" couple consists of a plate of zinc and another of copper sunk in the ground.  
—See also 1438.

1482. **Bezold, Wilhelm (Johann Friedrich) von.** (1837-1907.) Zur Theorie des Condensators. 60 pp. 8vo. (Inaugural dissertation.) Gottingen, 1860  
Mathematical theory of condensers.  
—See also 3430.

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1483. **Charault, R.** Recherches sur la déperdition de l'électricité statique par l'air et les supports. 36 pp. 4to. (Thèse.) *Paris, 1860*  
Loss of electric charge on a conductor due to its supports and the surrounding air.

1484. **Clement, K(nut) J(ongbohn).** (1803-1873.) Das grosse Nordlicht, 29. August 1859, und die Telegrafenverwirrung in Nordamerika und Europa. 121 pp. 8vo. *Hamburg, 1860*  
The aurora borealis of August 29, 1859 and its effect on the telegraph system of the world.

1485. **Comstock, John Lee.** (1789-1858.) Manual of natural philosophy. With questions for examinations and an appendix of problems. New edition, edited and largely augmented by R. D. Hoblyn. xvi+525 pp. ill. 1 plate. 12mo. *London, 1860*  
Short chapter on electricity and magnetism.  
—See also 1170.

1486. **Du Moncel, Th(éodore Achille Louis).** (1821-1884.) Étude des lois des courants électriques au point de vue des applications électriques. x+201 pp. 8vo. *Paris, 1860*  
Application of Ohm's law to the arrangement of cells as required to meet various practical conditions.

1487.——Recherches sur la non-homogénéité de l'étincelle d'induction. 115 pp. ill. 8vo. *Paris, 1860*  
The discharge of an induction coil under varying conditions.  
—See also 1223.

1488. **Faraday, Michael.** (1791-1867.) Course of six lectures on the various forces of matter and their relations to each other, edited by William Crookes. Second edition. vi+179 pp. ill. 12mo. *London, 1860*  
This edition has a short preface by (Sir) William Crookes.

1488a.——(Another edition.) 200 pp. ill. 12mo. *London, (1874)*  
—See also 787.

1489. **Flachat, Eugène.** (1802-1873.) De la traversée des Alpes par un chemin de fer. xv+294 pp. ill. 3 plates. 8vo. *Paris, 1860*  
Work of purely engineering interest.

1490. **Gill, Joseph.** An essay on the thermodynamics of elastic fluids. xvi+97 pp. ill. 8vo. *London, 1860-1861*  
General application of thermodynamical theory to heat-engines.

1491. **Lamont, (Johann) von.** (1805-1879.) Sur le magnétisme terrestre et l'aurore boréale. (Lettre à (Lambert) Ad(olphe) Jacques) Quetelet). (Extract Bull. Acad. Sc., Belgique, Ser. II. Vol. 8.) 31 pp. 8vo. *Brussels, 1860*  
A possible explanation of the relation existing between sun-spots and magnetic disturbances.

1492.——Magnétisme terrestre. (Extract, Bull. Acad. Sc., Belgique, Ser. II, Vol. 9.) 4 pp. 8vo. *Brussels, (1860?)*  
Note on the annual variation of the horizontal component of the earth's magnetic force.  
—See also 1049.

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1493. **Nichol, J(ohn) P(rangle).** (1804?–1859.) Cyclopaedia of the physical sciences, comprising acoustics, astronomy, dynamics, electricity, heat, hydrodynamics, magnetism, philosophy of mathematics, meteorology, optics, pneumatics, statics, etc. Second edition. ix+903 pp. ill. maps, pl. 8vo. London, 1860 Among the contributors to this encyclopaedia were Professors William Rowan Hamilton, Rankine, Stokes and Thomson (Lord Kelvin).

1494. **Nicklès, (François Joseph) J(érôme).** (1820–1869.) Les électro-aimants et l'adhérence magnétique. vii+302 pp. 5 plates. 8vo. Paris, 1860 The construction of electro-magnets with numerous original observations. —See also 1265.

1495. **Preece, (Sir) William Henry.** On the maintenance and durability of submarine cables in shallow waters. With an abstract of the discussion upon the paper by Charles Manby and James Forrest. (Extracts, Proc. Instit. Civil Engin. Vol. 20.) 82+28+14 pp. 1 plate. 8vo. London, 1860–1862 Remarks by Siemens, Latimer Clark, Sir Charles Bright, Willoughby Smith on the durability of gutta percha and the failure of cables. —See also 1580, 1604, 1619, 1652, 1998, 2249, 2278, 3556.

1497. **Prescott, George B(artlett).** (1831–1894.) History, theory and practice of the electric telegraph. xii+468 pp. ill. 8vo. Boston, 1860 The aurora borealis, p. 309; auroral current used in signaling, p. 318; telegraphic chronology, p. 404; poems on telegraphic subjects, pp. 232 and 352. —See also 2045, 2097, 2164, 2372, 2378, 5077.

1497† **bis. Reis Publications.** Collections of 7 original articles in German. 8vo. 1860–1873
 

1. Schenk. Philipp Reis, der Erfinder des Telephones. 16 pp. ill. Frankfurt, a. M. 1878.—2. Two advertisements signed Philipp Reis, one reads "Das Telephon, Ill."; the other is an invitation to subscribe for the apparatus. Both are dated Friedrichsdorf, August, 1863.—3. Advertisement signed J. Wilhelm Albert, dealer in scientific apparatus, dated Frankfurt, a. M., August 1863.—4. List of members of the Physical Society. Philipp Reis's name appears on page 5.—5. Reis, Philipp. Ueber Telephonie durch den galvanischen Strom. (Jahresbericht des Physikalischen Vereins, Frankfurt a. M. 1860–1861, pp. 57–64) dated Dec. 1861. (This article bears a note as follows: "I hereby certify that I have personally been present at the telephonic singing experiment of my friend Philipp Reis, mentioned in the above paper, and that I actually took part in the experiment, which was made in the lecture (or experimental) room of our Physical Society." (Signed) Dr. Boettger, Frankfurt 25. Febr. 1880.—6. Verzeichniss der physikalischen Apparate verfertigt bei J. Wilhelm Albert. 64 pp. Frankfurt a. M. 1866. Reis apparatus is listed on page 51 as No. 839, price fl. 21.00.—7. Another edition of the former Verzeichniss (No. 6) 91 pp. ill. Frankfurt a. M. 1873. (Reis apparatus is listed on page 67 as Nos. 957 and 958, with prices Rmk. 36.00 and 45.00.)

 —See also 1532bis, 2059bis.

1498. **Reitlinger, Edmund.** (1830?–1882.) Ueber Leitung der Elektricität. 27 pp. 12mo. Vienna, 1860 The beginnings of electric telegraphy; the "Scots Magazine," 1753 (see No. 378); Watson's Westminster-bridge experiment, 1747. (See No. 352.) —See also 1464.

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1499. **Robinson**, John. The Atlantic Ocean Telegraph from Ireland to Newfoundland, or the North Atlantic line via Faroe Islands, Iceland, Greenland and Labrador. 36 pp. map. 8vo. *London, 1860*  
Difficulties attending the laying and working of an Atlantic cable.

1500. **Rowell**, G(eorge) A(ugustus). A lecture on the storm in Wiltshire, which occurred on the 30th of December, 1859. 45 pp. 1 plate. 8vo. *Oxford, 1860*  
The author holds that electricity is the principal agent in all meteorological phenomena.  
—See also 1465.

1501. **Sainte-Anne**, Vérard M. de, (also Vérard de Sainte-Anne). Ligne de télégraphe, Europe, Asie, Afrique, Océanie, Amérique. Sections de Mossoul à Haiderabad, de Calcutta à Bangkok et Singapour. 32 pp. 1 map. 8vo. *Paris, 1860*  
Brief description of the various sections of the Indo-European telegraph line with map.

1502. **Siemens**, (Ernst) Werner (1816-1892) & (Sir) Charles William **Siemens**, (1822-1883). Outline of the principles and practice involved in dealing with the electrical conditions of submarine electric telegraphs. 7 pp. 4to. *London, 1860*  
Paper read at the British Association meeting of 1860. (Autograph copy.)

1502a.——(The same paper.) (Civil Engin. & Archit. Journ. Vol. 23, pp. 264-269.) 4to. *London, 1860*  
—See also 1214, 1654.

1503. **Tucker**, James. The reformed Roman or Oriental baths, reviewed as thermo-electrical temples of health, with medical remarks on the nature and scientific treatment of cattle distemper by the hot air baths. 36 pp. 8vo. *Dublin, 1860*  
Paper advocating the improvement of the sanitary condition of the people.

1504. **Willigen**, V(olkert) S(imon) M(aarten) van der. (1822-1878). Over de kleuren van gemengde plaatjes (mixed plates van Young). (Versl. Akad. Wetensch. Amsterdam, Vol. 10, pp. 37-414.) 1 plate. 8vo. *Amsterdam, 1860*  
Paper by the eminent Dutch physicist on interference phenomena.

1505.——Over electrische ontlading in het luchtledige. (Versl. Akad. Wetensch. Amsterdam, Vol. 10, pp. 291-296.) 8vo. *Amsterdam, 1860*  
Electric discharge in vacuum tubes.  
—See also 1304.

1506. **Weisse**, M(aximilian). (1798-1863.) Variation der Declination der Magnetnadel beobachtet in Krakau. (Denkschriften, Akad. Wiss. Math.-Nat. Kl., Vol. 18, pp. 63-98.) 4to. *Vienna, 1860*  
Observations of change in magnetic declination made at Cracow, 1839-1856.

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1507. **Béron**, Pierre (also Petr. **Berovich**). (1799-1871.) *Le fluide électrostatique contenant l'explication des faits électriques et électrochimiques de toutes les sciences.* 820 pp. ill. 8vo.  
*Paris, 1861*  
The phenomena of electricity explained on the assumption that we are endowed with a special percipient organ.

1508. **Burnett**, William Hickling. *The electric telegraph; and the patented improvements thereon.* 27 pp. 8vo. *London, 1861*  
Account of the author's improvements in electric telegraphs.

1509. **Clark**, (Josiah) Latimer. (1822-1898.) *Experimental investigation of the laws which govern the propagation of the electric current in long submarine telegraph cables.* (Reprinted from *Government Report on Submarine Cables*, 1861.) 48 pp. 1 plate. Folio  
*London, 1861*  
Phenomena due to the passage of a current through submarine cables briefly treated; retardation of signals.  
—See also 1566, 1715, 1934, 1970, 2133, 2272, 2897.

1510. **Clark**, (Josiah) Latimer (1822-1898) & (Sir) Charles (Tilston) Bright (1832-1888). *On the principles which should be observed in the formation of standards of measurement of electrical quantities and resistance.* (Atlantic and Government Report on Submarine Cables, pp. 49-50.) Folio  
*London, 1861*  
The principles refer to the units of e. m. f., quantity, current and resistance.  
(See No. 3686a.)  
—See also 1509, 1639.

1511. **Cochius**, Hermann. (Koch.) *De luce electrica.* 66 pp. 8vo.  
(Inaugural dissertation.) *Berlin, 1861*  
Nature of the spark discharge; also phenomena observed in vacuum tubes.

1512. **Dellmann**, (Johann) F(riedrich) G(eorg). (1805-1870.) *Elektrische Untersuchungen.* (Zeitschr. Math. Phys. Vol. 6, pp. 246-260.) 8vo.  
*Leipzig, 1861*  
Paper on atmospheric electricity.  
—See also 1013.

1513. **Dircks**, Henry. (1806-1873.) *Perpetuum mobile; or Search for self-motive power during the 17th, 18th and 19th centuries.* Illustrated from various authentic sources, in papers, essays, letters, paragraphs and numerous patent specifications. With an introductory essay. xli+558 pp. ill. 1 plate. 12mo.  
*London, 1861*  
Work embodying wide research: attempts at perpetual motion by means of magnets, pp. 5, 18, 329, 367, 394.  
—See also 1568.

1514. **Dodwell**, Robert. *Illustrated handbook to the electric telegraph.* iv+80 pp. 8vo. 8 plates. 8vo. *London, (1861)*  
Popular treatment of the electric telegraph.

1514a.——Second edition. 80 pp. 8 plates. 12mo. *London, 1862*  
—See also 5352.

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1515. **Dub**, (Christoph) Julius. (1817-1873.) *Der Elektromagnetismus.* xxii+516 pp. ill. 8vo. *Berlin, 1861*  
Electromagnetics and electro-magnetic instruments.

1515a.—*Die Anwendung des Magnetismus, mit besonderer Beruecksichtigung der neueren Telegraphie und der in der deutschen Telegraphen-Verwaltung bestehenden technischen Einrichtungen. Second edition. (Zweite vollstaendig neu bearbeitete und unter Beruecksichtigung der Fortschritte der Wissenschaft ergaenzte Auflage des vorstehenden Werkes.)* xx+857 pp. ill. 8vo. *Berlin, 1873*  
—See also 1253.

1516. **Du Bois-Reymond**, E(mil Heinrich). (1818-1896.) *Zur Theorie der astaticischen Nadelpaare.* (Ann. Phys. Chem., Vol. 112, pp. 1-14.) 1 plate. 8vo. *London, 1861*  
Theory of the astatic pair of needles. (See No. 1903.)  
—See also 1172.

1517. **Elias**, P. (1809-1878.) *Over het vermogen der magneto-elektrische machine.* (Versl. Akad. Wetensch., Amsterdam, Vol. 11, pp. 69-78.) 8vo. *Amsterdam, 1861*  
Theory of the author's famous "magneto-electric" machine.  
—See also 1015.

1518. **Erckmann**, Jules. *Établissement de lignes électriques sous-marines, sans cables sous-marins.* 14 pp. 8vo. *Paris, 1861*  
The author recommends brass conductors for sub-fluvial cables.

1519. **Gavarret**, (Louis Dominique) J(ules). (1809-1890.) *Télégraphie électrique.* 428 pp. ill. 12mo. *Paris, 1861*  
General description of the principles and apparatus used in telegraphy. The earth used for the first time as return circuit, p. 2; O'Shaughnessy's cable of 1839, p. 25.  
—See also 1042.

1520. **Gloesener**, M(ichael). (1794-1876.) *Traité général des applications de l'électricité.* Vol I. 8vo. *Paris, 1861*  
The various systems of telegraphy and apparatus used described; lightning arresters, chronoscopes, etc.  
—See also 1095.

1521. **Gmelin**, Leopold. (1788-1853.) *Handbook of chemistry.* Translated by Henry Watts. Second edition. Vol. I. 4 plates. 8vo. *London, 1861*  
A considerable part of the volume is devoted to such subjects as the relation of light to magnetism; magnetic condition of all matter, phenomena of electrolysis.

1522. **Greiss**, C(arl) B(ernhard). *Zur Geschichte des Magnetismus.* 18 pp. 4to. (Programm.) *Wiesbaden, 1861*  
Historical sketch of magnetism.

1523. **Guillemin**, C(laude) M(arie). (1822-1890.) *Recherches expérimentales sur l'induction Volta-électrique.* 69 pp. 1 plate. 4to. (Thèse.) *Montpellier, 1861*  
Induced currents: their properties and mode of production.  
—See also 2983.

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1524. **Hankel, W(ilhelm) G(ottlieb).** (1814-1899.) Elektrische Untersuchungen. Fuenfte & Sechste Abhandlung. Maasbestimmungen der elektromotorischen Kraefte. Erster und Zweiter Teil. (Abh. Saechs. Ges. Wiss. Math.-Nat. Kl., Vol. 6, pp. 1-52; Vol 7, pp. 585-693.) 4to. *Leipzig, 1861-1865*  
Absolute determination of e. m. f.  
—See also 1613, 2324, 3187.

1525. **Marié-Davy, E(dme) H(ippolyte).** (1820-1893.) Recherches théoriques et expérimentales sur l'électricité considérée au point de vue mécanique. 96 pp. 8vo. *Paris, 1861*  
The voltameter considered as a measurer of current-strength; also "velocity of electric propagation."

1526.——Résumé des recherches sur l'électricité. 60 pp. 8vo. *Paris, 1861*  
Abstracts of various memoirs on electricity written by the author.  
—See also 1182.

1527. **Matteucci, Carlo.** (1811-1868.) Manuale di telegrafia elettrica. xi+394 pp. 3 tables. 12mo. *Turin, 1861*  
Chapters on military and submarine telegraphs.  
—See also 985.

1528. **Pepper, John Henry.** (1821-1900.) Scientific amusements for young people. iv+124 pp. ill. 12mo. *London, 1861*  
The experiments are mainly chemical, electric and magnetic; Prof. Pepper was a popular lecturer and writer on elementary science.  
—See also 1751, 1874, 1991, 3609.

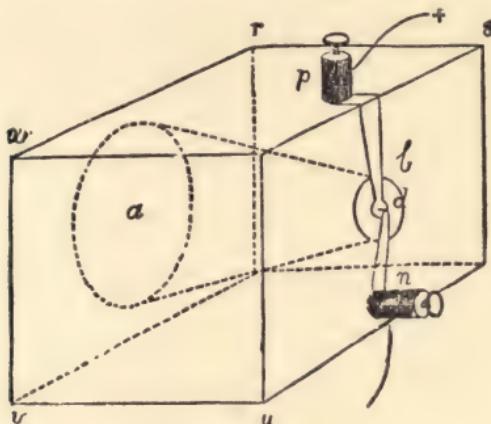
1529. **Perrot, Adolphe.** (1833-1887.) Recherches sur l'action chimique de l'étincelle d'induction de l'appareil Ruhmkorff.— Sur la nature de l'étincelle d'induction de l'appareil Ruhmkorff. 65 pp. 1 plate. 4to. (Thèse.) *Paris, 1861*  
The electrolytic effect of the spark from an induction coil.

1530. **Poey, André.** Relation historique et théorie des images photo-électriques de la foudre observées depuis l'an 360 de notre ère jusqu'en 1860. Second edition. 110 pp. 16mo. *Paris, 1861*  
Photo-electric effects of lightning gathered from writers covering the fifteen centuries previous to the year 1860.  
—See also 1370.

1531. **Predieri, P. C.** Di alcuni autografi di Luigi Galvani ultimamente rinvenuti. (Mem. Accad. Sc., Bologna, Vol. 12, pp. 21-40.) 4to. *Bologna, 1861*  
The author describes several manuscript works of Galvani relating to electrical matters.

1532. **Reis, (Johann Phillip).** (1834-1874.) Ueber Telephonie durch den galvanischen Strom. (Jahresber. Phys. Ver. Frankfurt a/M. 1860-1861, pp. 57-64.) ill. 8vo. *Frankfort, 1861*  
The author's telephone of 1861, the first successful attempt at transmitting sounds electrically.  
—See also 1497b, 1532bis, 2059bis.

With the above principles as a foundation, I have succeeded in constructing an apparatus with which I am enabled to reproduce the tones of various instruments, and even to a certain extent the human voice. It is very simple, and by means of the figure will be easily understood from the following explanation:—



In the cubical block of wood  $r s t u v w x$  there is a conical perforation  $a$ , closed at one end by a membrane  $b$  (pig's intestine), upon the middle of which there is cemented a conducting strip of platinum; this is connected with the binding screw  $p$  [auf deren Mitte ein stromleitendes Streifchen Platin festgekittet ist. Dieses steht mit der Klemme  $p$  in Verbindung]. From the binding screw  $n$ , another thin strip of metal [ein dünnes Metallstreifchen] extends until over the middle of the membrane, and ends here in a platinum wire placed at right angles to its length and surface.

From the binding screw  $p$ , a conducting wire runs through the battery to distant station, being connected with a coil of silk-covered copper wire and this again is connected with a conductor leading back to the binding screw  $n$ .

The coil at the distant station is about six inches long, is composed of six layers of fine wire, and, as a core in its centre, has a knitting-needle which projects about two inches at both ends. By means of the projecting ends, the coil rests upon two bridges of a resonant case. (All this part can, of course, be replaced by

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1532<sup>1</sup>bis. **Reis Publications:** Collection of 53 articles from various periodicals, etc., as below. Those in foreign languages are translated into English.

1861-1877

1. Frankfurter Conversationsblatt, Nov. 29, 1861. "Reproduction des Schales durch den galvanischen Strom" (Frankfurt). (Report of Reis's lectures of October and November, 1861).—2. Jahresbericht des Physikalischen Vereins zu Frankfurt am Main, fuer das Rechnungsjahr 1860-1861, pp. 57-64 (Published in 1862). "On telephony by means of the galvanic circuit current, by Philipp Reis." (Reis's lectures revised by himself.)—3. Jahresbericht des Physikalischen Vereins zu Frankfurt am Main: fuer das Rechnungsjahr 1861-1862. Extract of the notice of the two lectures by Reis, Oct. 26 and Nov. 16, 1861.—4. Die Fortschritte der Physik, XVII., for 1861, pp. 171-173. Article entitled "Ph. Reis: Telephony by means of the Electric current (Annual report of the Physical Society of Frankfort-on-the-Main, 1860-1861, pp. 57-64)."—5. Aus der Natur, Vol. 21, pp. 470-474, Leipzig, 1862. (Abstract of Reis's Lecture of 1861, with quotations from it.)—6. Didaskalia, May 8 and May 12, 1862. Extract copied from book of Sylvanus P. Thompson. (Reis exhibitions of May, 1862, before the Frei Deutsches Hochstift.)
7. Zeitschrift des Deutsch-Oesterreichischen Telegraphen-Vereins Berlin, Vol. 9, pp. 125, 1862. Legat article.—8, 9, 10. Deutsche Industrie-Zeitung, 1863, Chemnitz. Three articles from different numbers: No. 16, p. 184, April, 17, 1863; No. 18, p. 208, May 1, 1863; No. 22, p. 249, May 29, 1863.—11. Boettger's Polytechnisches Notizblatt, 1863, No. 61, p. 81. "On the transmission of tones to any desired distance by means of electricity. (Apparently an abstract of Reis's lecture.)—12. Frankfurter Conversationsblatt, June 30, 1863. (Reprint of the Boettger article.)—13. Dingler's Polytechnisches Journal, Vol. 168, p. 185. (Reprint of the Boettger article.)—14. Polytechnisches Contrabllatt, 1863, pp. 857-859. (Reprint of the Boettger article.)—15. Jahresbericht des Physikalischen Vereins zu Frankfurt-am-Main: fuer das Rechnungsjahr 1862-1863, p. 35. Memorandum of lecture of Reis, July 4, 1863—(the same) 1869-1870, p. 26. (Mention of the Reis lecture of 1861.)—16. Reis's letter to Ladd, July 13, 1863. Original on the Library of the Society; printed in the Journal of the Society of Telegraph Engineers and Electricians, for March, 1863, No. 46.—17. Report of British Association Meeting, from The Newcastle Daily Chronicle and Northern Counties Advertiser, Saturday, August 29, 1863. (Refers to paper of Ladd, noted below.)—18. The Civil Engineer and Architect's Journal, Vol. 26, pp. 307-308, 1863. "Acoustic telegraph," by W. Ladd. A paper read to the British Association, 1863.—19. Report of the thirty-third meeting of the British Association for the Advancement of Science, in August and September, 1863; published in 1864.—20. Prospectus of J. Wilh. Albert, Frankfort-on-the-Main, August, 1863.—21. Reis's circular of August, 1863.—22. Reis's descriptive circular, 9 August, 1863.—23. Dingler's Polytechnisches Journal, Vol. 169, p. 23. Reprint of Legat article.—24. Boettger's Polytechnisches Notizblatt, 1863, No. 5, p. 225. Boettger's account of Reis's improved apparatus, copied in the three following journals.—25. Dingler's Polytechnisches Journal, Vol. 169, p. 399.—26. Die Fortschritte der Physik, 1863, p. 96; and in 27. Dublin Medical Press, Oct. 14, 1863.—28. Cosmos. Weekly encyclopaedic review of the progress of the sciences, Paris, Dec. 25, 1863, Vol. 23, p. 705. "Note by M. Koenig."—29. Zeitschrift des Architectur und Ingenieur Vereins (Journal of the Society of Architects and Engineers for the Kingdom of Hanover), Vol. 12, p. 147. Dublin Medical Press article condensed.—30. Die Gartenlaube (An illustrated weekly paper of Leipzig), No. 51, Dec. 1863, "Der Musiktelegraph." Apparently an abstract of previous articles, with cuts.—31. Cosmos. Vol. 24, pp. 349, 352, Paris, March 22, 1864. Long article, purporting to be written from Koenig's establishment.—32. Portefeuille Economique des Machines, Paris, 1864,

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Vol. 9, p. 101. Second Saint-Edme article.—33. *Tagesblatt der 29. Versammlung Deutscher Naturforscher*, Giessen, September, 1864. From Sylvanus P. Thompson's book, and there entitled "Extract from the Report of the German Naturalist's Society, held at Giessen (1864).—34. Proceedings of the Literary and Philosophical Society of Manchester, Published at Manchester, 1865. Notice of Reis's telephone, by Prof. Clifton.—35. *Annalen der Chemie und Pharmacie*, 1864-1865. Foot-note of Burr article.—36. Koenig's Description of the Reis telephone. From Koenig's catalogue des appareils d'acoustique. Paris, 1865, p. 5.—37. Pisko. *Die neueren Apparate der Akoustik*, Vienna, 1865, pp. 94 *et seq.*—38. Pisko. *Die neueren Apparate der Akoustik*, Vienna, 1865, p. 241. The Reis prospectus.—39. *Handbuch der angewandten Elektricitätslehre*, von Karl Kuehn, 1865, pp. 1017-1021.—40. Hessler description of Reis telephone. Hessler's Lehrbuch der technischen Physik (Technical Physics), Vienna, 1866, Vol. 1, p. 648.—41. Catalogue of J. Wilh. Albert, Mechanician at Frankfort-on-the-Main, 1866. (Contains illustrations of Reis telephone.) 42. "Electricity," by Robert M. Ferguson, Edinburgh and London, 1867, p. 257.—43. *Lehrbuch der Physik und Meteorologie* (Text-book of Physics) von Joh. Mueller. Siebente Auflage, Zweiter Band, 1868, pp. 386-389.—44. The Manufacturer and Builder, May 1869, Vol. 1, No. 5, pp. 129, 130. Article by Dr. Van der Weyde on Reis telephone.—45. The Telegrapher, Vol. 5, No. 39. New York, 1869. (Reprint of Van der Weyde's article.)—46. American Association on Reis. Paper read by Dr. Van der Weyde at meeting of the American Association for the Advancement of Science, at Salem, August, 1869.—47. Boston Daily Advertiser, Aug. 25, 1869. Notice of the foregoing meeting.—48. The Wonders of electricity. Translated from the French of J. Baille. New York: Scribner, Armstrong & Co., 1872, pp. 140-143.—49. Zoellner's Das Buch der Erfindungen, Gewerbe and Industrien; Leipzig, 1872.—50. Albert's catalogue of 1873.—51. Wiedemann's Die Lehre vom Galvanismus, 1874, Vol. 2, pp. 598, 599.—52. Scientific American, March 4, 1876, Dr. Van der Weyde's second article.—53. Official report of exhibition at South Kensington in 1876, edited by Dr. Rudolph Biedermann, published in 1877. Notice of the Reis apparatus exhibited.

1532† **bis. Reis Publications.** *Die Gartenlaube*. Leipzig. No. 51, (December) 1863, pp. 807-809.—The Manufacturer and Builder. New York. Vol. I, No. 5, May. 1869, pp. 129-130.

*Leipzig, 1863; New York, 1869*

The article in the *Gartenlaube* describing and illustrating the Reis telephone, is apparently based upon previous publications; there were about 35 publications on the subject prior to 1864. The illustrated article in the *Manufacturer and Builder* on the Reis telephone is supposed to have been written by Dr. Van der Weyde.

—See also 1497bis.

1533. **Renard, N(icolas) A(imé).** *Théorie de l'induction en partant de l'hypothèse d'un seul fluide.* (Mém. Acad. de Stanislas.) 34 pp. 8vo. *Nancy, 1861*

Induced currents and mathematical theory.

—See also 3362.

1534. **Saward, George.** Deep-sea telegraphs: their past history and future progress. 48 pp. 8vo. *London, 1861*

—See also 2102.

1535. **Sharpe, Benjamin.** Treatise on the construction and submer-  
sion of deep-sea electric telegraph cables. 16 pp. 2 plates.  
8vo. *London, 1861*

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1536. Volpicelli, P(aolo). (1804-1879.) *Sulla elettricità dell' atmosfera.* (Extract, Atti Accad. Nuovi Lincei, Ann. 14.) 44 pp. 4to. *Rome, 1861*  
Result of researches on atmospheric electricity, using points and flames as collectors.  
—See also 1399.

1537. Wiedemann, Gustav (Heinrich). (1826-1899.) *Die Lehre vom Galvanismus und Elektromagnetismus nebst ihren technischen Anwendungen.* 2 vols. ill. 8vo. *Brunswick, 1861*  
Text-book of electricity and magnetism.  
—See also 2305, 3219.

1538. Bond, R. *Handbook of the telegraph.* Being a manual of telegraphy, telegraph clerk's remembrancer, and guide to candidates for employment in the telegraph service. 68 pp. ill. 12mo. *London, 1862*  
Manual of practical instruction.

1538a.—Second edition, revised and enlarged. To which is appended questions on magnetism, electricity and practical telegraphy by W. McGregor. 178 pp. 12mo. (Weale's Rudimentary Series, No. 138.) *London, 1873*

1539. Crova, André. *Mémoire sur les lois de la force électromotrice de polarisation.* 41 pp. 1 plate. 4to. (Thèse) *Metz, 1862*  
The e. m. f. of polarization was studied by means of a water voltameter.

1540. Dub, (Christoph) Julius. (1817-1873.) *Ueber den Einfluss der Dimensionen des Eisenkernes auf die Intensität der Elektromagnete.* 48 pp. 8vo. (Reprint Ann. Physik. Chem. Vol. 115.) 8vo. *Berlin, 1862*  
Brief research on the influence of the dimensions of the iron core of an electromagnet on the magnetism developed.  
—See also 1253.

1541. Du Bois-Reymond, (Emil Heinrich). (1818-1896.) *Ueber den zeitigen Verlauf voltælektrischer Induktionsstroeme.* (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., 1862, pp. 372-404.) 8vo. *Berlin, 1862*  
Mathematical theory of the induction coil.  
—See also 1172.

1542. Elliot, Robert John. On the magnetic combinations with some observations on the action of selenic acid on methyl-alcohol. 44 pp. 8vo. (Inaugural dissertation.) *Gottingen, 1862*  
Paper on the oxides of certain magnetic substances.

1543. Escayrac, de Lauture, de. (1822-1868.) *Analytic universal telegraphy; an international telegraphic language, simple, accurate, and three times shorter than the system at present in use.* 20 pp. 12mo. *London, 1862*  
Description of the author's system of signals.

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1544. — De la transmission télégraphique et de la transcription littérale des caractères chinois. 2 parts. 28 pp. ill. 3 plates. 4to. *Paris, 1862*  
The electric transmission of messages in the Chinese language.

1545. **Evans, (Sir) F(redéric) J(ohn) O(wen) (1816-1886) and A(rchibald) Smith.** (1813-1872.) Admiralty manual for ascertaining and applying the deviations of the compass caused by the iron in a ship. With a preface by J. W. (i. e., John Washington). 166 pp. 3 maps, 2 diagr. 8vo. (Published by order of the Admiralty.) *London, 1862*  
Compass correction treated both theoretically and practically.

1545a. — Fourth edition. 11+199 pp. 6 plates, 3 maps. 8vo. *London, 1874*  
—See also 1702, 2138.

1546. **Garnier, C. F.** Méthode mnémonique pour retinir facilement les signes de l'écriture télégraphique de Morse. 14 pp. 8vo. *Neuchatel, 1862*  
How to learn and remember the Morse alphabet.

1547. **Gibbs, Joseph.** Cotton cultivation in its various details, the barrage of great rivers and instructions for irrigating, embarking, draining, and tilling land in tropical and other countries possessing high thermomatic temperatures, especially adapted to the improvement of the cultural soils of India. viii+248 pp. 5 plates. 8vo. *London, 1862*

1548. **Kirchoff, G(ustav Robert).** (1824-1887.) Researches on the solar spectrum and the spectra of the chemical elements; translated with the author's sanction from the Transactions of the Berlin Academy for 1861 by Henry E. Roscoe. iv+36 pp. 3 plates. 4to. *Cambridge, 1862*  
This important memoir is accompanied by two lithographic maps of the lines in a part of the solar spectrum, showing coincidences with lines of metallic spectra.  
—See also 2196.

1549. **Knochenhauer, K(arl) W(ilhelm).** (1805-1875.) Ueber Fluesigkeiten im elektrischen Strom. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl. 1862, pp. 462-482.) 8vo. *Vienna, 1862*  
General research on the "flow" of the electric current.  
—See also 1234.

1550. **Minotto, Giovanni.** Descrizione della nuova pila Daniell. 8 pp. 8vo. *Turin, 1862*  
Description of the author's modification of Daniell's cell.  
—See also 1600.

1551. **Nystroem, C(arl) A(lfred).** Rechen-Aufgaben aus der Elektricitäts-Lehre besonders fuer Telegraphen-Beamte. 52 pp. 1 plate. 8vo. *Berlin, 1862*  
Problems in electricity with solutions: written for use of persons in charge of telegraph stations.  
—See also 5435.

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1552. **Pfeiffer, C(lemens).** Der elektrische Telegraph, eine gemeinfassliche Belehrung ueber das Wesen, die Einrichtung und die verschiedenen Arten der elektrischen Telegraphen, sowie die Erregung, Fortleitung und Geschwindigkeit des elektrischen Stromes. viii+142 pp. 4 plates. 8vo. *Leipzig, 1862*  
 Brief description of various telegraphs.  
 —See also 1618.

1553. **Reitlinger, Edmund.** (1830?–1882.) Ueber die Artunterschiede der positiven und negativen Elektricitat. 42 pp. 12mo.  
*Vienna, 1862*  
 Considerations on the two kinds of electricity.

1554.—Ueber Toene und einige Bewegungsscheinungen im Schliessungsbogen des galvanischen Stromes. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl. Vol. 45, pp. 453–482.) 8vo. *Vienna, 1862*  
 Sounds heard on opening an electric circuit.  
 —See also 1464.

1555. **Sabine, (Sir) Edward.** (1788–1883.) On the cosmical features of terrestrial magnetism, being the Reade lecture, delivered in the Senate House of the University of Cambridge, May 1862. 24 pp. ill. 8vo. *London, 1862*  
 Periodical laws in the mean effects of the larger magnetic disturbances.  
 —See also 945.

1556. **Schumann, J.** Eine neue Tangentenboussole. 32 pp. 4to.  
 (Programm.) *Konigsberg, 1862*  
 Mathematical theory of the tangent galvanometer.

1557. **Stricker, Wilhelm (Friedrich Karl).** (1816–1891.) Samuel Thomas von Soemmering, der Heilkunde Doktor, nach seinem Leben und Wirken geschildert. vi+23 pp. portr. 4to.  
 (Neujahrsblatt.) *Frankfort, 1862*  
 Life and work of Soemmering with sketch of his telegraph, as exhibited in August, 1809.

1558. **Thalén, T(obias) R(obert).** (1827–1905.) Recherches sur les propriétés magnétiques du fer. 43 pp. 4to. *Upsala, 1862*  
 Mathematical and physical paper on magnetic induction in various kinds of iron.  
 —See also 2051.

1559. **Oven, Adolf van.** De galvanische gasbatterij. 172 pp. 8vo.  
*Leyden, 1862*  
 Electrolysis and Grove's "gas" battery.

1560. **Volpicelli, P(aolo).** (1804–1879) Sulla polarità elettrostatica. V. comunicazione con appendice istorico-critica. (Atti Accad. Nuovi Lincei, Vol. 15, pp. 46–67.) 4to.  
*Rome, 1862*  
 Inquiry into the polarity of electrostatic machines.  
 —See also 1399.

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1561. **Walker**, William, Jr. Memoirs of the distinguished men of science of Great Britain living in the years 1807-1808; with an introduction by Robert Hunt. xii+228 pp. 1 plate. 8vo. *London, 1862*  
Biographical sketch of fifty-one scientific men.

1562. **Webb**, F(rederick) C(harles). (1828-1899.) Treatise on the principles of electrical accumulation and conduction. Part I. (No more published.) vi+156+32 pp. ill. 12mo. *London, 1862*  
Inquiry into changes due to electrostatic induction; illustrations are given of cases of electric charges induced under varying conditions.  
—See also 3110.

1563. **Weber**, Wilhelm (Eduard). (1804-1891.) Zur Galvanometrie. (Abh. Ges. Wiss., Goettingen, Math.-Nat. Kl. Vol. 10, pp. 3-96.) 1 plate. 4to. *Gottingen, 1862*  
Determination of the constants of a galvanometer.  
—See also 1110.

1564. **Wheatstone**, (Sir) (Charles) (1802-1875) and (Sir) F(rederick) A(ugustus) **Abel**. (1827-1902.) Rapport au secrétaire d'état de la guerre sur les résultats des recherches entreprises à Woolwich et à Chatham sur l'application de l'électricité de différentes sources, à l'explosion de la poudre. Traduit de l'anglais par F. J. A. Martinet. 85 pp. 1 plate. 8vo. *Paris, 1862*  
The induction coil and magneto machines as used for firing mines; Abel's fuse, illustrated.  
—See also 2183, 2308.

1565. "Omega." New magnetic theory. 14 pp. 12mo. *Tunbridge, 1862*  
"Attraction is the consequence of the conjunction of two or more magnetic atmospheres and their total or partial amalgamation," p. 13.

1566. **Clark**, (Josiah) Latimer. (1822-1898.) Letter by Josiah Latimer Clark to Sir William Thomson (Lord Kelvin) on retardative and inductive effects on long telegraph lines. (MS.) *June 5, 1863*  
Effect of electrostatic induction on the rate of transmission of signals through cables.  
—See also 1509.

1567. **Culley**, R(ichard) S(pelman). Handbook of practical telegraphy. viii+191+8+12 pp. ill. 8vo. *London, 1863*  
Standard work on the theory and practice of telegraphy. (See No. 5050.)

1567a.—Second edition, considerably enlarged. ix+296 pp. ill. pl. 8vo. *London, 1867*

1567b.—Third edition, revised and enlarged. ix+317 pp. ill. pl. 8vo. *London, 1868*

1567c.—Fourth edition, revised and enlarged. vi+330 pp. ill. pl. 8vo. *London, 1870*

1567d.—Fifth edition, revised and enlarged. xvi+408 pp. ill. pl. 8vo. *London, 1871*

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1567e.—Sixth edition, revised and enlarged. xvi+443 pp. ill. pl. 8vo. *London, 1874*  
—See also 1937, 3390.

1568. **Dircks, Henry.** (1806-1873.) Contribution towards a history of electro-metallurgy establishing the origin of the art. xvi+102 pp. portr. 12mo. *London, 1863*  
The author contends that C. J. Jordan is the inventor of the art of electro-metallurgy.  
—See also 1513.

1569. **Fitzroy, (Robert).** (1805-1865.) Arrangements for meteorologic telegraphy. Second edition. 32 pp. 8vo. *London, 1863*  
Method of transmitting telegraphically the readings of the usual meteorological instruments.

1570.—Weather-book, a manual of practical meteorology. Second edition. xvi+480 pp. 16 plates. 8vo. *London, 1863*  
Atmospheric electricity and magnetic phenomena are frequently referred to in this weather-book.  
—See also 3288.

1571. **Gherardi, S(ilvestro).** (1802-1879.) Sul magnetismo polare de mattoni e d'altre terre cotte. Continuazione e propugnazione della memoria: Sul magnetismo polare di palazzi e di altri edifizi etc. (Extract, Mem. Accad. Sc. Bologna, Vol. 3.) 23 pp. 4to. *Bologna, 1863*  
This paper treats of the magnetism observed in *bricks* and terra cotta; contains references to early writers. Boyle is omitted.  
—See also 894.

1572. **Klein, F. H.** The foretelling of the weather in connexion with meteorological observations. Together with a description of the telegraphic warning system introduced into the Netherlands, June 1860, as proposed by Dr. Buys-Ballot. Translated from the original Dutch by A. Adriani. 31 pp. 8vo. *London, 1863*  
Fitzroy's rules are given and discussed; but the author prefers to infer the state of the weather from what he calls the "deviation" rather than the normal barometric reading.

1573. **Latini, Brunetto.** (1230-1294.) Le livre dou trésor, publié pour la première fois d'après les manuscrits de la Bibliothèque Impériale, de la Bibliothèque de l'Arsenal, et plusieurs manuscrits des départements et de l'étranger par P. Chabaille. xxxvi+735 pp. 4to. (Collection de documents inédits sur l'histoire de France.) *Paris, 1863*  
This famous work of the Italian statesman and philosopher (Dante's tutor), contains on p. 147 one of the earliest references to the mariner's compass.

1574. **Marcoartu, Arturo de.** Lignes sous-marines télégraphiques d'Europe aux Amériques de l'Atlantique au Pacifique. 56 pp. 1 map. 8vo. *Paris, 1863*  
Description of existing lines and projected telegraph routes.

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1574a.—(English translation.) Telegraphic submarine lines between Europe and America and the Atlantic and Pacific. 53 pp. 8vo. *New York, 1863*

1575. **Masson, A(ntoine Phillibert) (1806-1860) & (Louis François Clément) Breguet.** (1804-1883.) Mémoire sur l'induction. (Mém. présenté à l'Acad. des. Sc. 1841.) 22 pp. 1 plate. 8vo. *Paris, 1863*  
Experiments on the *extra current*; conversion of dynamic into static electricity and vice versa.  
—See also 941, 1154.

1576. **Neckam, Alexander.** (1157-1217.) De naturis rerum libri duo; with the poem of the same author, De laudibus divinae sapientiae. Edited by Thomas Wright. lxxviii+521 pp. L. 8vo. *London, 1863*  
This famous work of the mediaeval monk and scholar treats of animate and inanimate nature as known in the 12th century. A remarkable reference to the compass will be found on p. 183; see also xxxiv. The volume contains a biographical and critical preface of 78 pages by Thomas Wright, the eminent English antiquary.

1577. **Noble, W(illiam) H(enry).** Report on ballistic experiments. vi+129 pp. pl. 8vo. *London, 1863*  
Details of various electric methods for measuring the velocity of projectiles.

1577a.—Second report (on the same subject). vi+284 pp. pl. 8vo. *London, 1865*  
Results of experiments made with various classes of projectiles using electroballistic apparatus.  
—See also 1617.

1578. **Parran.** Note sur la lampe électrique de MM. Dumas et Benoit, et sur son application au tirage des coups de mines. (Ann. Mines. Vol. 4, pp. 455-472.) 8vo. *Paris, 1863*  
Vacuum tubes as a source of light in mines.

1579. **Piggott, W(illiam) P(eter).** On the importance of ocean telegraphy: the impediments to its success, and the way to obviate them. 16 pp. 12mo. *London, 1863*

1580. **Preece, (Sir) (William Henry).** Railway telegraphs and the application of electricity to the signaling and working of trains. With an abstract of the discussion upon the paper by Charles Manby and James Forrest. 75+11 pp. 8vo. *London, 1863*  
Details of the system of signaling used on the London and South-Western Railway.  
—See also 1496.

1581. **Raoult, François (Marie).** (1830-1901.) Étude des forces électromotrices des éléments voltaïques. Propositions de chimie. 100 pp. 2 plates. 4to. (Thèse.) *Paris, 1863*  
Study of the e. m. f. of a Daniell's cell, taking account of all the variables.  
—See also 3359.

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1582. **Reitlinger, Edmund.** (1830?-1882.) Ueber elektrische Induction. 29 pp. 12mo. Vienna, 1863  
Electromagnetic induction, eddy currents; Arago's "rotations;" Fizeau adds condenser to the Ruhmkorff coil.  
—See also 1464.

1583. **Soemmering, (Dettmar) W(ilhelm).** (1793-1871.) Der elektrische Telegraph als deutsche Erfindung Samuel Thomas von Soemmering's aus dessen Tagebuechern nachgewiesen. 23 pp. 8vo. Frankfort, 1863  
Notes from Soemmering's diary relating to his discovery of electric telegraphy.

1584. **Thomson, (Sir) William (Lord Kelvin).** (1824-1907.) The electric telegraph. (Royal Instit. Great Britain, Lecture No. 1.) 2 pp. 8vo. London, 1863  
Notes of lectures given at the Royal Institution; qualities of a cable; theory of signaling.  
—See also 1085.

1585. **Timbs, John.** (1801-1875.) Stories of inventors and discoverers in science and the useful arts. Second edition. vii+344 pp. ill. pl. 12mo. London, 1863  
A popular history of scientific discoveries and inventions.  
—See also 1734.

1586. **Tyndall, John.** (1820-1893.) Electricity at rest and electricity in motion. (Six lectures.) 23 pp. 8vo. London, 1863-1864  
Notes of a juvenile course of lectures delivered at the Royal Institution.  
—See also 1609, 1629, 1735, 1785, 2009, 2182, 2950.

1587. **Volpicelli, Paolo.** (1804-1879.) Sulla elettrostatica induzione. Ottava comunicazione. (Atti Accad. Nuovi Lincei, Vol. 16, pp. 484-498+643-666+874-876+1092-1093.) 4to. Rome, 1863  
Defense of the author's views on electrostatic induction.  
—See also 1399.

1588. **Weber, Heinrich.** Ueber die Bestimmung des galvanischen Widerstandes der Metalldraehte aus ihrer Erwaermung durch den galvanischen Strom nach absolutem Maasse. 33 pp. 2 plates. 4to. (Inaugural dissertation.) Leipzig, 1863  
Change in the electric resistance of wires due to the thermal effect of the current.  
—See also 2304.

1589. **Althaus, Julius.** On paralysis, neuralgia and other affections of the nervous system and their successful treatment by galvanisation and faradisation. Third edition. viii+236 pp. 12mo. London, 1864  
Special therapeutical applications of continuous and of induced currents.  
—See also 1852, 1963.

1590. **Buckmaster, J(ohn) C(harles).** Elements of experimental physics, acoustics, light and heat, magnetism and electricity. vi+202 pp. ill. 12mo. London, 1864  
—See also 1899.

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1591. **Dauriac**, Philippe. La télégraphie électrique, son histoire et ses applications en France, en Angleterre, aux États-Unis suivie d'un guide de l'expéditeur de dépêches. viii+120 pp. 12mo. *Paris, 1864*  
The various systems of electric telegraphy briefly described.

1592. **Docq**, Adrien Joseph. (1820-1875.) Réponse à la question 123; la lumière, la chaleur, l'électricité, le magnétisme, ces manifestations de force, qu'on attribuait autrefois aux fluides impondérables, on les a déduites dans les derniers temps de mouvements d'un éther, parfaitement élastique, qui pénètre tout. 179 pp. 4to. *(1864?)*  
The conclusion reached after a discussion of 179 pages is that the mechanism of electric and magnetic phenomena is completely unknown.

1593. **Dowling**, Charles Hutton. Series of metric tables, in which the British standard measures and weights are compared with those of the metric system at present in use on the continent. xxxiv+124 pp. 8vo. *London, 1864*  
Tables for facilitating the conversion of British weights and measures to the metric system and vice versa.

1594. **Du Moncel**, Th(éodore Achille Louis). (1821-1884.) Traité théorique et pratique de télégraphie électrique à l'usage des employés télégraphistes, des ingénieurs, des constructeurs, et des inventeurs. xxvi+613 pp. ill. 3 plates. 8vo. *Paris, 1864*  
Descriptive hand-book of electric telegraphy.  
—See also 1223.

1595. **Gherardi**, Silvestro. (1802-1879.) Lettera sopra un singolare esperimento del magnetismo delle terre cotte. (Rend. Accad. Sc. Bologna, 1864, pp. 71-75.) 8vo. *Bologna, 1864*  
Note on the magnetic qualities of a specimen of terra-cotta.  
—See also 894.

1596. **Huart**, (E.) (also Colnet d'Huart). Nouvelle théorie mathématique de la chaleur et de l'électricité. (Soc. Sc. Nat. Grand-Duché de Luxembourg, Vol. 7, pp. i-vii+1-190.) 3 plates. 8vo. *Luxemburg, 1864*  
Mathematical treatise on heat and electricity, embodying the author's own views.

1597. **Le Boulengé**, P(aul Émile). Mémoire sur une chronographe électro-balistique. (Mém. Sav. Etrang. Acad. Sc., Belgique, Vol. 32, pp. 1-29.) 4to. *Brussels, 1864*  
Illustrated description of the author's chronograph for ballistic determinations.  
—See also 1682.

1598. **Lindig**, Franz. Quomodo mutantur vires electricae cum temperatura. 35 pp. 8vo. (Inaugural dissertation.) *Berlin, 1864*  
Effect of temperature on the e. m. f. of a cell.

Fig. 2.

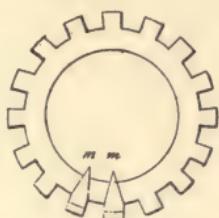


Fig. 2.

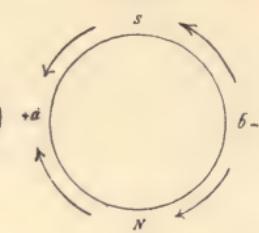


Fig. 3.

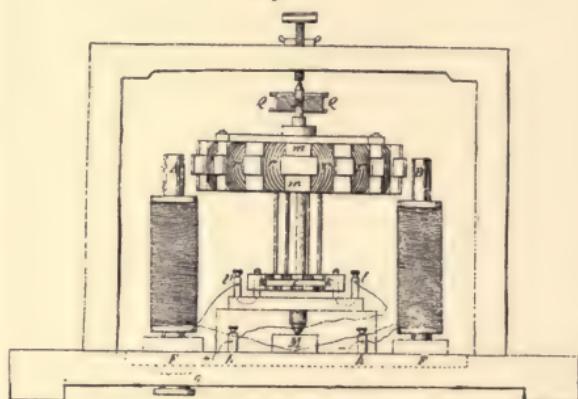
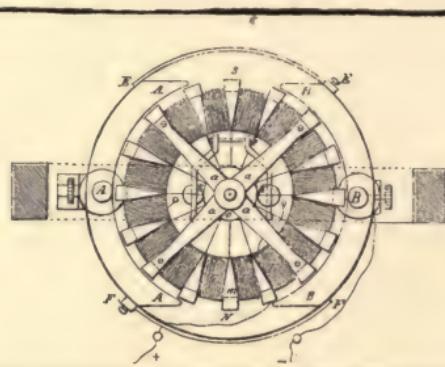


Fig. 4.



Tom. Santini inv.

1601. PACINOTTI.

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1599. **Matteucci, C(arlo).** (1811-1868.) *Della pila di Volta, della corrente elettrica e delle sue applicazioni.* 72 pp. 1 plate. 12mo. *Turin, 1864*  
 Popular exposition of some of the effects of the electric current.  
 —See also 985.

1600. **Minotto, Giovanni.** *Pile à Sable.* (Daniell-Minotto.) *Expériences et comparaisons avec les autres piles et informations sur les applications.* 4 pp. 4to. *Turin, 1864*  
 Experimental data concerning the internal resistance and current strength of the Minotto cell.  
 —See also 1550.

1601. **Pacinotti, Antonio.** (Born 1841.) *Descrizione di una macchinetta elettro-magnetica (costruita nel 1860).* (Nuovo Cimento, Vol. 19, pp. 378-384.) 1 plate. 8vo. *Pisa, 1864*  
 Paper of historic interest containing a description of the author's *ring-armature with closed coils*. Though invented in 1860, this machine was first described by Pacinotti in *Nuovo Cimento*, 1864. The investigations and discoveries of Dr. Pacinotti entitle him to a distinguished place among the pioneers of electrical science.

1601a.—*Electro-Magnetic machine.* Translated from the *Il Nuovo Cimento*, June, 1864. (Proof-copy.) 8 pp., 4 ill. 8vo.  
*(No date.)*  
 —See also 1948, 2444, 3735.

1602. **Parson, George.** *Elementary magnetism, and the local attraction of ships' compasses adapted for the use of navigators; with a table of the true azimuth of the mean place of the north pole star.* 40 pp. 1 table. 12mo. *Sunderland, (1864)*  
 Methods of avoiding errors in navigation caused by local disturbances.

1603. (Perry, Horatio J.). *Los cables submarinos de Cádiz à las Americas.* 135 pp. 8vo. *Madrid, 1864*  
 Cable from Cadiz to the West Indies.

1604. **Preece, (Sir) William Henry.** *The application of electricity to domestic purposes.* 24 pp. ill. 8vo. *London, 1864*  
 Electric bells and batteries for same.  
 —See also 1496.

1605. **Radcliffe, Charles Bland.** (1822-1889.) *Lectures on epilepsy, pain, paralysis and certain other disorders of the nervous system.* xxiii+340 pp. ill. 12mo. *London, 1864*  
 Electro-medical work pointing out the effects to be expected from the application of the electric current, both direct and alternating, in the treatment of nervous troubles.  
 —See also 1999, 3201.

1606. **Schoenemann, Th(eodor).** (1812-1868.) *Das Horizontal-Dynamometer and seine Anwendung auf die Mechanik. Nebst Anleitung eines neuen Princips fuer den Ausfluss tropfbarer und luftfoermiger Fluessigkeiten.* 140 pp. 5 plates. 8vo. *Berlin, 1864*  
 Description and mathematical theory of the horizontal dynamometer.

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1607. **Scoutetin**, (Robert Joseph) H(enri). (1799-1871.) De l'électricité considérée comme cause principale de l'action des eaux minérales sur l'organisme. xi+420 pp. 8vo. *Paris, 1864*  
Electric effects due to the contact of different mineral waters.  
—See also 1372, 5559.

1608. **Thompson**, J. Baynes. Mechanical theory of electric induction and its application. 14 pp. 8vo. *London, 1864*

1609. **Tyndall**, John. (1820-1893.) On a magnetic experiment. 7 pp. 8vo. *(London,) 1864*  
Notes of a lecture on the lengthening of a bar during magnetization.  
—See also 1586.

1610. **Boltzmann**, Ludwig. (1844-1906.) Ueber die Bewegung der Elektrizitaet in krummen Flaechen. (Sitz. Ber. Akad. Wiss. Math-Nat. Kl., Vol. 52, pp. 214-221.) 8vo. *Vienna, 1865*  
Electrical stream-lines on curved surfaces.

1611. (Coignet, Fran<sup>ç</sup>ois.) Note sur les b<sup>t</sup>tons agglom<sup>er</sup>és <sup>à</sup> base de chaux syst<sup>ème</sup> Coignet. 48 pp. 8vo. *Paris, 1865*  
Concrete and its uses.

1612. **Ebner**, Moritz, von. Ueber Telegraphie in ihrem Zusammenhang mit dem Entwicklungsgange der Naturwissenschaften, I.; und in ihrer Anwendung auf die Zwecke des Krieges, II. (Mitt. K. K. Génie Comité, Vol. 10, pp. 337-377.) 8vo.  
*Vienna, (?) 1865*  
General considerations on the transmission of energy.  
—See also 1352.

1613. **Hankel**, W(ilhelm) Gottlieb. (1814-1899.) Ueber die Durchbohrung des Stanniols durch den Entladungsschlag der elektrischen Batterie. (Sitz. Ber. Saechs. Ges. Wiss. Math.-Nat. Kl., Vol. 17, pp. 94-116.) 8vo. *Leipzig, 1865*  
Some effects due to the discharge of Leyden batteries.  
—See also 1524.

1614. **Hooper**, William. India-rubber considered in reference to its applicability as an insulator for telegraphic conductors. 12 pp. L. 8vo. *(London,) 1865*  
—See also 1645, 3546.

1615. **Martin**, Th(omas) Henri. (1813-1884.) Observations et th<sup>eor</sup>ies des anciens sur les attractions et les r<sup>ep</sup>ulsions magnétiques et sur les attractions <sup>é</sup>lectriques. 42 pp. 4to.  
*Rome, 1865*  
Early history of magnetism and electricity with copious references; work of erudition.  
—See also 1650.

1617. **Noble**, W(illiam) H(enry). Description of Navez-Leur's electro-ballistic chronoscope for determining the velocity of projectiles. (Rev. Techn. Milit., Vol 4, pp. 245-279.) 8vo.  
*Paris, 1865*  
General history of ballistic experiments with description of methods and apparatus used by various investigators.  
—See also 1577.

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1618. **Pfeiffer**, Clemens. *Handbuch der elektro-magnetischen Telegraphie nach Morse'schem System.* xii+282 pp. 12mo. (Neuer Schauplatz der Kuenste und Handwerke, Vol. 272.) *Weimar, 1865*  
 Elementary manual of the electric telegraph.  
 —See also 1552.

1619. **Preece**, (Sir) William Henry. *On railway electric signalling.* 39 pp. ill. 1 plate. 8vo. *London, 1865*  
 Electricity "supplies the only means that science possesses to enable us to carry out the block system in its entirety."  
 —See also 1496.

1620. **Roux**, F. L(ouis). *Étude sur la fabrication et la pose des cables électriques sousmarins.* 52 pp. 8vo. *Paris, 1865*  
 Reliability of the plummet for deep-sea soundings.

1621. **Rowett**, (William). *Ocean telegraph cable; its construction, the regulation of its specific gravity and submersion explained.* 122 pp. map. 4 plates. 8vo. *London, 1865*  
 Generalities about submarine cables and ocean-depths; preference given to the "hempen" cable.  
 —See also 1428.

1622. **Russell**, (Sir) W(illiam) H(enry). *Atlantic telegraph; illustrated by Robert Dudley.* v+117 pp. 28 plates. 4to. *London, (1865)*  
 The illustrations are of much interest.

1623. **Schoedler**, Friedrich. (1813-1884.) *Treasury of science, natural and physical.* Translated and edited by Henry Medlock. xii+617 pp. ill. 8vo. *London, 1865*  
 Short chapter on the elementary parts of electricity and magnetism.

1624. **Seguin**, (Marc) (Senior). (1786-1875.) *Mémoire sur les causes et sur les effets de la chaleur et de la lumière et de l'électricité.* 113 pp. L. 8vo. *Paris, 1865*  
 The ether of space is held to be an unnecessary assumption.  
 —See also 3143.

1625. **Serafini**, Filippo. (1831-1891.) *Der Telegraph in seiner Beziehung zum Buergerlichen und Handelsrechte.* Uebersetzt aus dem Italienischen von Leone Roncali. 78 pp. 8vo. *Vienna, 1865*  
 The electric telegraph and its relation to law.

1626. **Seward**, William H(enry). (1801-1872.) *Der Telegraph um die Erde, zur Verbindung der oestlichen und westlichen Halbkugel in der Richtung ueber Moskau, dem Armur, die Behringstrasse, British Columbia und Californien.* Aus dem Englischen uebersetzt von Cl. Gerke. 60 pp. 1 map. 8vo. *Hamburg, 1865*  
 Plan for telegraphic communication all around the globe.

1627. **Stefan**, J(oseph). (1835-1893.) *Ueber einige Thermoelemente von grosser elektromotorischer Kraft.* (Sitz. Ber. Akad. Wiss. Math.-Nat., Kl. Vol. 51, pp. 260-262.) 8vo. *Vienna, 1865*  
 Note on various thermo-electric combinations for the production of strong currents.

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1627a.—(English translation.) On some thermo-elements of great electromotric force. (Philos. Mag., Ser. IV, Vol. 30, pp. 77-78.) 8vo. *London, 1865*

1628. Thomsen, (Hans Peter Jorgen) J(ulius). Polarisations-Batterie. (Extract, Zeitschr. Physikal. Chemie, Vol. 3.) 32 pp. ill. 8vo. *Hamburg, 1865*  
Description of the secondary battery devised by the author.  
—See also 3210.

1629. Tyndall, John. (1820-1893.) Heat considered as a mode of motion, being a course of twelve lectures delivered at the Royal Institution of Great Britain in 1862. Second edition, with additions and illustrations. xx+532 pp. ill. 12mo. *London, 1865*  
This edition embodies the author's researches on radiant heat.  
—See also 1586.

1630. Kerkwijk, J. J. van. Beschrijving van eenige verschijnselen, die zich voordoen in de telegraafedraden, door invloed van atmosferische elektriciteiten van het norderlicht. (Verh. Instit. Ingen., 1864-1865.) 36 pp. 1 plate. 8vo *The Hague, 1865*  
Telegraph disturbances caused by atmospheric electricity and by polar auroræ.  
—See also 3652.

1631. Wenckebach, W(ilhelm). (1803-1847.) Sur Petrus Adsigerius et les plus anciennes observations de la déclinaison de l'aiguille aimantée traduit du Hollandais par T. Hooiberg. (Ann. Matematica, Vol. 7, pp. 159-168.) 4to. *Milan, 1865*  
The author concludes that the reference to magnetic declination in the Leyden MS. of the letter of *Petrus Peregrinus* (1269) (see No. 46), is an interpolation made in the early part of the XVI. century.

1632. Zetzsche, Karl Eduard. (1830-1894.) Die Copirtelegraphen, die Typendrucktelegraphen und die Doppeltelegraphie. Ein Beitrag zur Geschichte der elektrischen Telegraphie. vi+198 pp. ill. 8vo. *Leipzig, 1865*  
Various writing and printing-telegraphs.  
—See also 1961, 2058, 2119, 2219, 3899.

1633. The Atlantic telegraph; its history from the commencement of the undertaking in 1854 to the return of the Great Eastern, in 1865. 117 pp. pl. & maps. 12mo. *London, 1865*  
The book contains photographs of Cyrus W. Field and Prof. Thomson, (Lord Kelvin).

1634. Notice sur les travaux de (Jean Bernard) Léon Foucault. 37 pp. 4to. *Paris, 1865*  
Sketch of the scientific work of Foucault (1819-1868), including his *pendulum* demonstration of the rotation of the earth made in the year 1851.

1635. Adley, (Charles) C(oles). The story of the telegraph in India. viii+86 pp. 1 map. 8vo. *London, 1866*  
Criticism of the instruments and methods used on the Indian telegraph lines; also plea for the emancipation of telegraphs from Government control.  
—See also 1274.

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1636. **Akin, C. K.** On the origin of electricity. (Trans. Philos. Soc., Cambridge, Vol. 11, pp. 6-20.) 4to. Cambridge, 1866  
Electric manifestation is due to heat, friction and chemical action.  
—See also 3382.

1637. **Benet, S(tephen) V(incent).** Electro-ballistic machines and the Schultz's chronoscope. 47 pp. 4 plates. 4to.  
New York, 1866  
Brief historical review with full details of the chronoscope.

1638. **Brester, Albert.** Elektrolytische onderzoekingem. 209 pp. 8vo.  
Delft, 1866  
Decomposition of solutions by various compounds by means of the electric current.

1639. **Bright, (Sir) Charles Tilston.** (1832-1888.) The telegraph to India and its extension to Australia and China. With an abstract by James Forrest. 66 pp. 1 plate. 8vo. London, 1866  
The discussion to which this lecture gave rise elicited information on the durability of insulating materials, on the manufacture and failure of cables and other related subjects.  
—See also 1510, 4427.

1640. **Field, Henry M(artyn).** (1822-1907.) History of the Atlantic telegraph from the beginning 1854, to the completion August, 1866. 364 pp. ill. 8vo.  
London, 1866  
Story of the great cable enterprise popularly told.

1641. **Gassiot, J(ohn) P(eter).** (1797-1877.) Stratified discharges in vacuum tubes. (Intellectual Observer, 1866, pp. 82-84.) 1 plate. 8vo.  
London, 1866

1642.—Electrical researches with vacuum tubes. (Intellectual Observer, 1866, pp. 289-290.) 1 plate. 8vo.  
London, 1866  
Some of these experiments were made with a water-battery of 4000 small cells.  
—See also 1455.

1643. **Gérard, (Antoine J.)** Le magnétisme à la recherche d'une position sociale, sa théorie, sa critique, sa pratique. 233 pp. portr. 12mo.  
Paris, 1866  
Electro-medical work, Mesmer justified.  
—See also 5424.

1644. **Grover, J(ohn) W(illiam).** Estimates and diagrams of railway bridges for turnpike, public and occupation roads in the embankments of double or single lines, and cuttings of double lines; also culverts of various dimensions. 34 plates. Folio.  
London, 1866

1645. **Hooper, William.** On the electrical and mechanical properties of Mr. Hooper's India rubber insulated wire for telegraphic cables. 13 pp. 10 plates. diagrs. 4to.  
London, 1866  
Paper read at the Nottingham meeting of the British Association, 1866.  
—See also 1614.

1646. **Hopkins, Evan.** (? -1867.) Invention for an improved mode of correcting the deviation of compasses in iron ships, and

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of constructing ships' compasses and binnacles, so as to prevent deviation. 8 pp. 1 plate. 8vo. *London, 1866*  
Method of depolarizing the hull of iron ships in order to eliminate its influence on the compasses.  
—See also 1061.

1647. **Kuehn, Karl.** (1816–1869.) *Handbuch der angewandten Elektricitaetslehre mit besonderer Beruecksichtigung der theoretischen Grundlagen.* 2 vols. xx+1396 pp. ill. tabl. 8vo. (*Allgemeine Encyclopaedie der Physik, Vol. 20, parts 1 & 2.*) *Leipzig, 1866*  
These two volumes form part of an encyclopaedia of physics; they deal with lightning-conductors, electricity in mines and telegraphy; also *bibliography* of the subjects treated.  
—See also 1763.

1648. **Larkins, Walter F.** The commercial code of signals for the use of all nations. xxiv+246 pp. pl. 4to. *London, 1866*  
Signaling at sea by means of flags.

1649. **Macintosh, John.** Facts and figures relative to submarine telegraphy. 36 pp. 1 plate. 8vo. *London, 1866*  
The commercial features of submarine telegraphy.

1650. **Martin, Thomas) Henri.** (1813–1884.) *La foudre, l'électricité et le magnétisme chez les anciens.* v+418 pp. 12mo. *Paris, 1866*  
Knowledge of the ancients on the magnet, electric attraction, thunder, lightning, the aurora borealis, the mariner's compass.  
—See also 1616.

1651. **Page, Charles Grafton.** (1812–1868.) Petition to the Honorable the Senate and House of Representative in Congress Assembled. (On the induction coil.) 35 pp. 8vo. *New York, (1866?)*  
The author puts forward his claim to the invention of the induction coil.  
—See also 1689, 2729.

1652. **Preece, (Sir) William Henry.** Electrical inter-communication in trains in motion. 23 pp. pl. 16mo. *London, 1866*  
—See also 1496.

1653. **Sestier, Félix.** *De la foudre, de ses formes et ses effets sur l'homme, les animaux, les végétaux et les corps bruts, des moyens de s'en préserver et des paratonnerres; rédigé sur les documents laissés par M. Sestier et complété par M. C. Méhu.* 2 Vols. 8vo. *Paris, 1866*  
Treats extensively of the effects of lightning, death by lightning, and also the history and construction of lightning-conductors.

1654. **Siemens, (Sir) Charles William.** (1822–1883.) *Die elektrische Telegraphie.* 40 pp. 8vo. (*Sammlung gemeinverstaendlicher wissenschaftlicher Vortraege, Heft 22.*) *Berlin, 1866*  
Historical sketch of the electric telegraph.  
—See also 1502, 1655, 2107, 2177, 2258, 2378, 3107.

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1655. Siemens, (Ernst) W(erner) (1816-1892.) & (Sir) Charles William Siemens. (1822-1883.) *Methode fuer fortlaufende Beobachtungen der Meerestemperatur bei Tiefenmessungen.* (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., 1866, pp. 416-418.) 8vo. *Berlin, 1866*  
Determination of deep-sea temperature by the bridge method.  
—See also 1214, 1654.

1656. Thomson, (Sir) William. (Lord Kelvin.) (1824-1907.) *Atlantic telegraph cable, address delivered before the Royal Society of Edinburgh. With other documents.* 31 pp. ill. 8vo. *London, 1866*  
Velocity of settling, angle of immersion, method of grappling for submarine cables.

1656a.—(The same paper.) 12 pp. 8vo. *London, 1866*  
The forces concerned in laying and lifting a deep-sea cable.  
—See also 1085.

1657. Walker, Edward. (?-1893.) *Terrestrial and cosmical magnetism. The Adams prize essay for 1865.* iv+336+vi pp. 10 plates. 8vo. *Cambridge, 1866*  
The essay contains a brief history and development of magnetic research connected with terrestrial magnetism. The volume contains numerous magnetic charts of each of the three elements and their variations.  
—See also 3712.

1658. Airy, (Sir) George Biddell. (1801-1892.) *Account of experiments in iron-built ships.* (Extract, Philos. Trans. Roy. Soc. 1839.) 44 pp. 8vo. (The magnetism of ships and the deviations of the compass. Papers edited by B. Franklin Greene. No. 2.) *Washington, 1867*

1659.—On the correction of the compass in iron-built ships. (Extract, Colburn's United Service Journ. June, 1840.) 5 pp. 8vo. (The magnetism of ships and the deviations of the compass. Papers edited by B. Franklin Greene. No. 3.) *Washington, 1867*

1660.—On the observed deviations of the compass in wood-built and iron-built ships. (Extract, Philos. Trans. Roy. Soc. 1856.) 53 pp. 8vo. (The magnetism of ships and the deviations of the compass. Papers edited by B. Franklin Greene. No. 4.) *Washington, 1867*

1661.—On the building of iron ships and the correction of their compasses. (Extract, Trans. Instit. Naval Archit. Vol. 1, 1860.) 6 pp. 8vo. (The magnetism of ships and the deviation of the compass. Papers edited by B. Franklin Greene. No. 6.) *Washington, 1867*

1662.—Experiments on the comparative susceptibility to magnetism of hot-rolled and cold-rolled iron. (Extract, Trans. Instit. Naval Archit. Vol. 3, 1862.) 2 pp. (The magnetism of ships and the deviations of the compass. Papers edited by B. Franklin Greene. No. 10.) *Washington, 1867*

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1663.—On the difference in the magnetic properties of hot-rolled and cold-rolled malleable iron, as regards the power of receiving and retaining induced magnetism of sub-permanent character. (Extract, *Philos. Trans. Roy. Soc.* 1862.) 16 pp. 8vo. (The magnetism of ships and the deviations of the compass. Papers edited by B. Franklin Greene, No. 14.) *Washington, 1867*  
 —See also 1376.

1664. **Arnoux, E(rnest).** *Lettre électrique; nouveau service télégraphique rendu populaire:* I. par l'extension donnée aux dépêches; II. par l'abaissement des tarifs; III. par des moyens nouveaux permettant l'augmentation des transmissions. xix+106 pp. 7 plates. 8vo. *Paris, 1867*  
 The object of the work is to popularize the electric telegraph by securing secrecy for the dispatches and by reducing the tariff.

1665. **Bloxam, John C(harlton).** *Terrestrial magnetism.* (Proc. *Meteorol. Soc.* Vol. 3, pp. 317-326.) 8vo. *London, 1867*  
 Analysis of magnetic observations made at St. Helena during the period 1842-1843.

1666. **Bright, Edward B(railsford).** *The Atlantic telegraphs.* A description of the manufacture, laying and working of the cables of 1865 and 1866; with an explanation of the means employed for recovering the lost cable of 1865. 20 pp. 2 plates. 8vo. *Liverpool, 1867*  
 Short account of the manufacture and laying of the Atlantic cables of 1865 and 1866.  
 —See also 1316.

1667. **Brooke, Charles.** (1804-1879.) *Elements of natural philosophy; or, An introduction to the study of the physical sciences based on the treatise by the late Golding Bird.* Sixth edition. xxxii+851 pp. ill. 12mo. *London, 1867*  
 Gassion on the striated discharge, p. 456; ozone generator, p. 464; Bakewell's telegraph, p. 529; "organic" electricity, p. 552.

1668.—Remarks on the nature of energy and the correlation and transmutation of its various physical forms. 14 pp. 12mo. *London, 1867*  
 The author is disposed to do away with a universal ether as a medium for the transmission of energy.  
 —See also 2858.

1669. **Clausius, R(udolph Julius Emmanuel).** (1822-1888.) *Die Potentialfunktion und das Potential.* Second edition. vi+119 pp. L. 8vo. *Leipzig, 1867*  
 Notable mathematical memoir on potential and the potential function.  
 —See also 2134, 2351, 2959.

1670. **De la Rive, A(uguste Arthur).** (1801-1873.) *Michael Faraday. His life and works.* (Reprinted from a translation in *Philos. Mag. Ser. IV*, Vol. 34, pp. 409-437.) (Smithsonian Report, 1867, pp. 227-245.) 8vo. *Washington, 1867*  
 "I have said that induction was the most important of Faraday's discov-

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eries; I must now say that the action of magnetism and electricity on light was the most brilliant," p. 240.

—See also 818.

1671. (Dodd, George.) (1808-1881.) Railways, steamers and telegraphs, a glance at their recent progress and present state. vi+236 pp. ill. 10 plates. 8vo. *London, 1867*

1672. Eisenlohr, W(ilhelm). (1799-1872.) Anleitung zur Ausfuehrung und Visitation der Blitzableiter. Second edition. 32 pp. 3 plates. 8vo. *Karlsruhe, 1867*  
Function and construction of lightning-conductors.  
—See also 904.

1674. Ferguson, Robert M. Electricity. viii+285 pp. ill. 12mo, (Chamber's Educational Course.) *London, 1867*  
Text-book of the subject.

1674a.—New edition, revised and extended by James Blyth. 410 pp. ill. 12mo. (Chamber's Educational Course.) *London, 1882*

1675. Fonvielle, W(ilfrid) de. Éclairs et tonnerre. 365 pp. ill. pl. 12mo. (Bibliothèque des Merveilles.) *Paris, 1867*  
Popular description of phenomena connected with atmospheric electricity; ships' compasses and lightning, p. 214.  
—See also 1907, 4179.

1676. Harris, (Sir) William Snow. (1792-1867.) Treatise on frictional electricity in theory and practice, edited with a memoir of the author by Charles Tomlinson. xxxiv+291 pp. ill. 8vo. *London, 1867*  
Treatise on a subject to which the author made important contributions. The work closes with two lectures, one on atmospheric electricity and the other on protection from lightning.  
—See also 801, 948.

1677. Jenkin, (Henry Charles) Fleeming. (1833-1885.) On electrical measurements. 74 pp. ill. 8vo. *London, 1867*  
Notes of a course of four lectures on the principles involved in the measurement of electrical quantities; also two lectures on the construction and maintenance of telegraph lines. The lectures were reported by Captain R. H. Stotherd.  
—See also 1870, 2237, 2402, 3137.

1678. Johnston, Robert W. The telegraph and its proposed acquisition by the government. 43 pp. 8vo. *Edinburgh, 1867*  
Advantages of government ownership.

1679. Lamont, J(ohann) von. (1805-1879.) Handbuch des Magnetismus. viii+468 pp. ill. L. 8vo. (Allgemeine Encyclopaedie der Physik, Vol. 15.) *Leipzig, 1867*  
Important work on the mathematical theory of magnets and magnetic induction.

1680.—On the earth-current and telegraphic currents. Translated by W. T. Lynn. (Proc. Meteorol. Soc., Vol. 3, pp. 352-357.) 8vo. *London, 1867*  
The author also wrote a work on the "earth-current and its connection with the magnetism of the earth," 1862.  
—See also 1049.

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1681. **Lardner**, Dionysius. (1793-1859.) Electric telegraph; revised and rewritten by E(dward B(railsford) Bright. xii+272 pp. ill. 8vo. *London, 1867*  
Telegraph to India; Atlantic cables, electric transmission of time.  
—See also 876.

1682. **Le Boulengé**, P(aul Émile). Études de balistique expérimentale. 94 pp. 4 plates. 8vo. (Brussels,) 1867  
Time of flight of a projectile determined by the author's "electric clepsydra."  
—See also 1597.

1683. (Leclanché, G(eorges). (1839-1882.) Notes sur l'emploi des piles électriques en télégraphie. 16 pp. ill. 8vo. *Paris, 1867*  
Remarks on the use of the Leclanché battery.  
—See also 4442.

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An account of the introduction of the pneumatic dispatch system in London together with a description of the Pneumatic Railway and Postal Dispatch at the Exhibition of the American Institute, New York, 1867.

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Exhaustive work on the *Epistola de Magnete*, A. D., 1269, (See No. 46), of Pierre de Maricourt commonly called *Petrus Peregrinus*; critical comparison of various codices; complete Latin text; diagrams. Bertelli was a member of the Barnabite order, professor of physics in the College De la Quercia, Florence, where he died in 1905. Bertelli wrote 60 memoirs on electricity, telegraphy, meteorology and seismic phenomena.

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1719. **Figuier**, (Guillaume Louis). (1819-1894.) Les merveilles de la science; ou, Description populaire des inventions modernes. 2 vols. ill. portr. L. 8vo. *Paris, 1868*  
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Summary of three manuscripts left by Galvani on electro-physiological researches: reference to *Lord Mahon* on the return-stroke.  
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1724. Le Roux, F(rançois) P(ierre). Expériences diverses relatives à la production de la lumière voltaïque. (Bull. Soc. d'Encouragement pour l'Industrie Nationale, 1868, pp. 1-15.) 4to. *Paris, 1868*  
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Short paper on electrodynamic theory.

1726. Morgan, Charles E. (1836-1867.) Electro-physiology and therapeutics; being a study of the electrical and other physical phenomena of the muscular and other systems during health and disease, including the phenomena of the electrical fishes. (Edited by William Alexander Hammond.) xvi+714 pp. ill. 8vo. *New York, 1868*

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1728. Noad, Henry M(inchin). (1815-1877.) The inductorium, or induction coil; being a popular explanation of the electrical principles on which it is constructed; with the description of a series of beautiful and instructive experiments, illustrative of the phenomena of the induced current. Third edition. 117 pp. ill. pl. 12mo. *London, 1868*  
Professor Henry's induced currents of various orders; Ladd's dynamo-electric machine; the induction coil; discharge in vacuum tubes.  
—See also 1065.

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1729. **Parker, John A.** Polar magnetism: a paper read before the American Institute, on the cause of polar magnetism; the attraction of the needle to the pole; the variations of the compass and the phenomena incident to the same. 34 pp. diagr. 8vo. *New York, 1868*  
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1732. **Sirks, Jan.** Over het meten van den galvanischen geleidings-weerstand. 78 pp. 8vo. (Inaugural dissertation.) *Deventer, 1868*  
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1734. **Timbs, John.** (1801-1875.) Wonderful inventions from the mariner's compass to the electric telegraph cable. xv+400 pp. ill. pl. 12mo. *London, 1868*  
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Explanation and use of the various signals in use in the army.

1737. **Telegraph secrets** By a stationmaster. Fourth edition. 122 pp. 12mo. *London, 1868*  
Series of curious incidents.

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The author studies the variations in the magnetizing current of the field-magnets of a dynamo and the current in the external circuit.  
—See also 3495.

1739. Dumas, Floridor. *Traité de télégraphie électrique militaire à l'usage des officiers de toutes armes et des fonctionnaires de l'administration des lignes télégraphiques qui peuvent être appelés à faire partie du service télégraphique civil en campagne.* 178 pp. ill. tab. 12mo. *Paris, 1869*  
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1740. Du Moncel, Théodore Achille Louis. (1821-1884.) *Notice sur le câble transatlantique.* 46 pp. ill. 8vo. *Paris, 1869*  
The Atlantic cable: historical and technical sketch.  
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The author gives the text of two manuscript papers of Galvani on the torpedo together with his remarks on same.  
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—See also 2936.

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Discussion of Romagnosi's observation (1802), of the action of an electrode from a battery on a compass-needle. The Italian text is accompanied by a manuscript translation. (See No. 974.)  
—See also 3581.

1745. Head, (Sir) Francis B(ond). (1793-1875.) *The royal engineer.* xii+391 pp. pl. 8vo. *London, 1869*  
Chapter on the military electric telegraph.  
—See also 1157.

1746. Jenkins, Thornton A(lexander). (1811-1893.) *Ships' compasses: including the subjects of binacles and swinging the ship.* 37 pp. 8vo. (Bureau of Navigation.) *Washington, 1869*  
Practical information concerning ships' compasses.

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1747. **Laurencin, Paul.** *L'étincelle électrique, son histoire, ses applications.* 228 pp. ill. pl. 12mo. *Paris, 1869*  
 Popular exposition of the properties and applications of the electric spark and the electric current.  
 —See also 2034.

1748. **Ludewig, Julius.** *Der Bau von Telegraphenlinien mit besonderer Berücksichtigung der Vorschriften der Telegraphen-Verwaltung des Norddeutschen Bundes, sowie der neuen Massordnung. Fuer Telegraphen-Beamte und Techniker.* viii+306 pp. ill. 8vo. *Leipzig, 1869*  
 Practical manual of construction of telegraph lines.  
 —See also 1840, 1918.

1749. **Morse, S(amuel) F(inley) B(reese).** (1791-1872.) *Examination of the telegraphic apparatus and the processes in telegraphy.* 166 pp. ill. 8vo. (Paris, Universal Exposition, 1867. Reports of the U. S. Commissioners.) *Washington, 1869*  
 Comprehensive description of the telegraphic apparatus exhibited in Paris, 1867; photograph of Prof. Morse taken shortly before his death in 1872.  
 —See also 1687.

1750. **Palmieri, Luigi.** (1807-1896.) *Description du seismographe électro-magnétique, appareil enregistreur des tremblements de terre et de l'appareil à conducteur mobile avec l'électromètre bifiliaire pour les observations comparables de l'électricité atmosphérique.* Traduction française de A. Mauche. 16 pp. 2 plates. 4to. *Naples, 1869*  
 The seismograph of the observatory of Mount Vesuvius which was devised by the author..  
 —See also 1079.

1751. **Pepper, J(ohn) H(enry).** (1821-1900.) *Cyclopaedic science simplified; embracing light, heat, electricity, magnetism, pneumatics, acoustics, chemistry.* xiii+685 pp. ill. Sq. 16mo. *London, (1869)*  
 A well-known popular manual of the elements of experimental science. (See No. 1828.)  
 —See also 1528.

1752. **Poggendorff, (Johann Christian).** (1796-1877.) *Ueber das Holtz'sche Rotationsphaenomen.* (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., 1869, pp. 754-785.) 8vo. *Berlin, 1869*  
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 Handbook specially designed to meet the wants of the telegraph operator.  
 —See also 2163, 2433, 2444, 5110.

1754. **Sauer, George.** *The telegraph in Europe. A complete statement of the rise and progress of telegraphy in Europe, show-*

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ing the cost of construction and working expenses of telegraphic communications in the principal countries, etc. Corrected from Official Returns. 177 pp. tab. 8vo. *Paris, 1869*  
The introduction gives a sketch of the rise and progress of telegraphy; the rest of the work treats of general telegraphic statistics in the various countries of Europe.

1755. **Stockalper, de.** *Les avantages du Simplon sous le rapport de la construction et de l'exploitation d'un chemin de fer.* 72 pp. 5 plates. 4to. *Lausanne, 1869*

Reasons for recommending the Simplon route.

1756. **Ternant, A. L.** *Manuel pratique de télégraphie sous-marine, construction, pose, entretien et exploitation de câbles sous-marins, épreuves électriques qu'ils subissent etc.* xi+226 pp. 2 plates. 12mo. *Paris, (1869)*

Construction and laying of a submarine cable. An appendix gives data of cables laid.

—See also 1888, 2007, 2375, 3799.

1757. **Waltenhofen, A(dalbert Carl) von.** *Ueber die Grenzen der Magnetisirbarkeit des Eisens und des Stahles.* (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., Vol. 59, pp. 770-788.) 8vo.

*Vienna, 1869*

According to the author "anomalous magnetizing" is the residual magnetism which he found in thick iron cores to be opposite in character to the temporary magnetism due to the magnetizing current.

—See also 1849, 3475.

1758. **Warren, Thomas T. P. Bruce.** *On electrification.* 11 pp. 8vo. *Croydon, 1869*

Note on the "electrification" of cables.

—See also 3591.

1759. **Electric disc and experiments.** By a positive conductor. viii+96 pp. ill. 12mo. *London, 1869*

A revolving glass-disc furnishes electricity for a number of popular experiments.

1760. **Liverpool, Compass Commission.** The magnetism of ships and the deviations of the compass comprising the three reports of the Liverpool Compass Commission, with additional papers by Archibald Smith and F(rederic) J(ohn) (Owen) Evans. xiii+344 pp. 49 plates. 8vo. (Reprinted.)

*Washington, 1869*

The three reports of the Commission contain important information on the magnetism of iron ships and on methods of correcting resulting errors. These are followed by Scoresby's *Journal of the Royal Charter* with critical introduction by Archibald Smith. (See No. 1704.)

1761. **New magneto-electric machine.** (Student and Intellectual Observer, Vol. 2, pp. 444-447.) ill. 8vo. *London, 1869*

The machine was devised by Browning.

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1762. **Poles, wires, and cables; or, Electric telegraphs: their past and their future, their commercial advantages.** 60 pp. 8vo.  
*London, 1869*  
 Early history of the electric telegraph; ocean telegraphy; government acquisition of telegraphs.

1762a.—**Second edition.** 60 pp. 8vo. *London, 1870*

1763. **Kuehn, Karl. (1816–1869.) Die elektro-magnetische Materie in ihrer kosmischen Existenz.** 18 pp. 12mo.  
*St. Johann a. d. Saar, (186?)*  
 Electromagnetic paper on the sun, comets and Saturn's rings.  
 —See also 1647.

1764. **Netoliczka, Eugen. (1825–1889.) Geschichte der Elektrizitaet bis zur Entdeckung des Galvanismus.** 26 pp. 4to.  
*(Gratz, 186?)*  
 Succinct history of electrical discovery down to the time of Coulomb.

1765. **Airy, (Sir) George Biddell. (1801–1892.) Treatise on magnetism, designed for the use of students in the University.** xv+220 pp. ill. 8vo.  
*London, 1870*  
 Mathematical treatise with special reference to the effect of the magnetism of iron ships on their compasses.  
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 Comparison of spark-length, density and quantity of electricity.

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 The use of electricity, especially the static form, for curative purposes.

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 Chemical affinity, the Peltier effect, and the e. m. f. of contact.  
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Electrical apparatus for deep-sea sounding.

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Mathematical dissertation on Weber's electrodynamic law of attraction.

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Demonstration and application of Gauss's theorem.

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Currents at making and breaking in an induction coil.

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Resistance and size of electrodes.

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 —See also 1027.

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 Ohm's law and its application to the determination of faults in telegraph circuits.  
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 On the theory of the Holtz machine.  
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1784. **Rother, L. F. W.** Der Telegraphenbau. Ein Handbuch zum praktischen Gebrauch fuer Telegraphen-Techniker und Beamte bearbeitet. Third edition. x+306 pp. 8vo. *Berlin, 1870*  
 Construction and operation of telegraphs and submarine cables.

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 A useful *résumé* of afternoon lectures given at the Royal Institution, April-June, 1870.

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 Tyndall defends the view that bismuth acquires opposite polarity to that of iron when placed in a non-uniform magnetic field.  
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 Short history of telegraphy followed by technical and administrative matters.

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 The charge of condensers with special reference to the formula given by Aepinus.  
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Brief mathematical and practical treatment of the compensation of ships' compasses.

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1792. **Bertelli, Timoteo.** (1826-1905.) *Intorno a due Codici Vaticani della Epistola de magneti di Pietro Peregrino di Maricourt ed alle prime osservazioni della declinazione magnetica.* (Si aggiunge una nota di B. Boncompagni intorno alle edizioni della detta epistola del Peregrino.) (Extract, Bull. Bibliogr. Storia Sc. Mat. Fis. Vol. IV, pp. 303-332.) 31 pp. 4to.  
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Critical study of the two Vatican codices of the letter of *Peregrinus* (See No. 46), on the magnet; followed by a note on magnetic declination with copious references.  
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Determination of the magnetic dip and declination in the Collegio Romano.

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*Geneva, 1871*  
The action of a magnetic field on the electric discharge in rarefied gases.  
—See also 818, 1827.

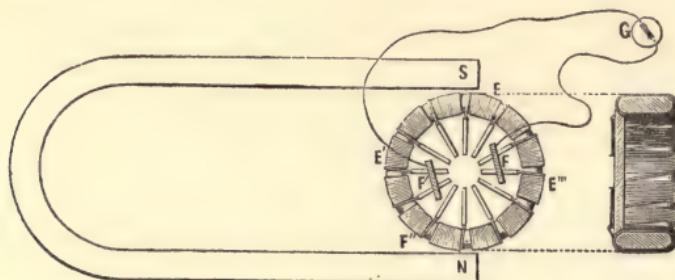
1795. **(Dioscorides, Dr.) (pseud.)** *Anno Domini 2071;* translated from the Dutch original with preface and additional explanatory notes by A. V. W. Bikkers. x+132 pp. 12mo. *London, 1871*  
Work of fancy and humor.

1796. **Du Moncel, Th(éodore) Achille Louis.** (1821-1884.) *Recherches sur les meilleures conditions de construction des électro-aimants.* xi+124 pp. 8vo.  
*Paris, 1871*  
Mathematical investigation of the best way of winding electro-magnets for telegraph purposes.

1796a.—(English translation.) *Elements of construction for electro-magnets.* Translated by Ch. J. Wharton. xiii+86 pp. 12mo.  
*London, 1883*  
—See also 1223.

nables, il est possible de réaliser un appareil fournissant des courants continus pendant une durée indéfinie.

» Supposons en effet que l'électro-aimant, au lieu de présenter la forme rectiligne de la *fig. 1*, prenne la forme circulaire  $EE'E'E''$  (*fig. 2*). Sou-



mettons-le à l'action simultanée des deux pôles N. et S. d'un aimant en fer à cheval N.-O.-S. Supposons l'anneau électro-aimant tournant autour de son centre d'un mouvement uniforme dans le sens indiqué par la flèche.

» Le pôle S. produira, dans la partie de l'anneau qui est dans son voisinage, un courant dont le sens pourra être déterminé soit au moyen de l'expérience directe, soit en se reportant à celle que nous avons rapportée sur l'électro-aimant droit. On comprend aisément que le pôle N. produira dans son voisinage un courant de sens contraire au précédent. Enfin il est aisé de se rendre compte que, dans les deux parties de l'anneau placées à angle droit, et qu'on peut appeler *moyennes*, il n'y a aucun courant produit. Si donc on veut recueillir les deux courants contraires produits simultanément dans le fil de l'anneau électro-aimant, il suffit d'établir deux frotteurs correspondants aux parties moyennes, qui sont comme les rhéophores de cette pile d'un nouveau genre.

» Il est opportun de donner quelques détails sur ces frotteurs, tels qu'ils ont été employés jusqu'ici et tels qu'ils sont dans la machine mise sous les yeux de l'Académie.

» Si le fil enroulé sur l'anneau est très-gros, si en outre on n'a placé qu'une seule rangée de tours de ce fil, comme il peut être utile de le faire pour certaines expériences, il suffit de dénuder le fil sur une ligne et d'établir des frotteurs pressant sur cette partie nue. Mais si l'on emploie du fil plus fin et si l'on met sur l'anneau un grand nombre de rangées de fil, on

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1797. **Felici**, (Riccardo). Sulle azioni elettriche dei corpi non conduttori soggetti all' influenze di un corpo elettrizzato. (Mem. della Soc. Italiana dei XL, Vol. II.) 48 pp. 2 plates. 4to.  
*Florence, 1871*  
 Studies of the polarization of the dielectric.  
 —See also 1173.

1798. **Gherardi**, S(ilvestro). (1802-1879.) Raggiuglio di un altro manoscritto inedito del celebre Galvani. 29 pp. 4to.  
*Bologna, 1871*  
 Latin text of an unpublished electro-physiological paper by Galvani with remarks on the manuscript by Prof. Gherardi.

1799.——Sopra un' idea di telegrafo magnetico. (Extract, Rivista Scient. Industr., 1871.) 15 pp. 8vo.  
*Florence, 1871*  
 This letter refers to the allusion to a magnetic telegraph which occurs in Porta's *Magiae Naturalis*, 1589 (See No. 64); to Famianus Strada's *Proclusiones Academicæ*, 1617 (See No. 90); and van Etten's *Récréations Mathématiques*, 1626 (See No. 93).  
 —See also 570, 894.

1800. **Gramme**, Z(enobie) T. Sur une machine magnéto-électrique produisant des courants continu. 4 pp. ill. 4to. *Paris, 1871*  
 Note on the principle of the Gramme ring.

1801. **Green**, George. (1793-1841.) Mathematical papers edited by N. M. Ferrers. x+336 pp. 8vo.  
*London, 1871*  
 The term *potential* first used; the concept of potential and its application to problems in general physics; propagation of light in crystalline media.  
 —See also 840.

1802. **Harkness**, William. (1837-1903.) Observations on terrestrial magnetism and on the deviations of the compasses of the United States iron-clad *Monadnock* during her cruise from Philadelphia to San Francisco, in 1865 and 1866. v+220 pp. Folio. (Smithsonian Contributions to Knowledge, No. 239.)  
*Washington, 1871*

1803. **Helmholtz**, Hermann (Ludwig Ferdinand). (1821-1894.) On the relation of the physical sciences to science in general. Translated by C. F. Kroeh. (Smithsonian Report, 1871, pp. 217-234.) 8vo.  
*Washington, 1871*  
 —See also 1259.

1804. **Kohlrausch**, F(riedrich Wilhelm Georg). Das Weber'sche compensirte Magnetometer zur Bestimmung der erdmagnetischen Intensität. 13 pp. 1 plate. 8vo. *Gottingen, 1871*  
 Theory and use of Weber's magnetometer.  
 —See also 1723.

1805. **Le Couteur**, P. E. The questions of the syllabus of examination of masters in the laws of the deviation of the compasses of an iron ship, and in the means of compensating or correcting it, with their answers. 41 pp. 1 plate. 12mo.  
*Liverpool, (1871)*

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1807. **Saint-Edme**, Ernest. L'électricité appliquée aux arts mécaniques, à la marine, au théâtre. xi+234 pp. ill. 8vo. *Paris, 1871*  
Numerous applications of electricity explained and illustrated.

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A school-primer with chapters on electricity and magnetism.

1809. **Snaith**, W. A. Magnetism and electricity for elementary classes. Seventh edition. 96 pp. ill. 16mo. *Manchester, (1871)*  
Work written for beginners.

1810. **Steinschneider**, Moritz. (1816-1907.) Intorno ad alcuni passi d'opere del medio evo relativi alla calamita, lettere a D. B. Buoncompagni. (Extract, Bull. Bibliog. Storia Sc. Mat. Fis., Vol. 4.) 48 pp. 4to. *Rome, 1871*  
References to the magnet by Arabian writers.

1811. **Villari**, Emilio. (1836-1904.) Sui fenomeni termici che si manifestano quando la corrente elettrica si stabilisce nel ferro ed in altri metalli. (Extract, Nuovo Cimento, Ser. II, Vol. 4.) 64 pp. 1 plate. 8vo. *Pisa, 1871*  
Influence of magnetism on electric conductivity.  
—See also 1894, 1927, 3521.

1812. **Volpicelli**, P(aolo). (1804-1879.) Su talune trasformazioni di forza viva in calorico e sulla quistione a ciò relativa tanto fra Grassi e Galileo quanto per l'attrito dell'aria. (Atti Reale Accad. Sc. Rome, Vol. 24, pp. 136-164.) 4to. *Rome, 1871*  
On the equality of work and heat: special reference to the controversy between Galileo and Father Grassi on the same subject.  
—See also 1399.

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Information adapted to the capacity of a juvenile audience.

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One of the Bridgewater treatises; short sections on the part which electricity and magnetism play in the mechanism of the atmosphere.  
—See also 898.

1815. **Treatise** upon terrestrial magnetism. Containing an outline of the discoveries and theories connected therewith; an inquiry as to whether the terrestrial sphere has four or only two

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magnetic poles; on the probable causes of terrestrial magnetism; on irregularities observed in the secular variation, etc. vi+179 pp. maps, diagrs. 8vo. *Edinburgh, 1871*  
Historical outline of magnetic discovery; variation of declination in time and place; charts of variation; the author's new magnetic theory.

1816. **Anderson, (Sir) James.** (1824-1893.) Statistics of telegraphy. viii+121 pp. 1 map. 8vo. *London, 1872*  
Discussion of the principles which affect the price of messages; also type of cable best suited for submarine telegraphy.  
—See also 3985.

1817. **Baille, J.** Wonders of electricity, translated from the French, edited with numerous additions by J. W. Armstrong. viii+335 pp. ill. pl. 8vo. (Illustrated Library of Wonders, Second Series.) *New York, 1872*  
Short description of an electric telephone, p. 142; the electrical work of *Charles G. Page*, p. 324.  
—See also 2061.

1818. **Blavier, E(douard) E(rneste).** (1826-1887.) Considérations sur le service télégraphique et sur la fusion des administrations, des postes et des télégraphes. 126 pp. 8vo. *Nancy, 1872*  
The postal telegraph; telegraph economist.  
—See also 1381.

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Mathematical theory of the induction coil; discussion of results.

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Application of the author's galvanometer and rheostat to telegraph testing.  
—See also 3383.

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—See also 2067, 5387.

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Study of trees struck by lightning: the oak, elm, poplar, chestnut, etc.  
—See also 2188, 2444.

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The influence of a magnet in causing an electric discharge *in vacuo* to rotate.  
—See also 818, 1794.

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Professor Everett has made this a very useful treatise; his additions refer mainly to electric potential and electrometers.

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Description with drawings of the author's galvanometer for absolute measurements.  
—See also 3687.

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—See also 4412.

1831. **Gherardi, Silvestro. (1802-1879.)** Intorno ad alcuni documenti relativi alla vita e agli studi del Galvani. (Extract, Rendiconti Accad. Sc., Istituto Bologna.) 3 pp. 8vo. *Bologna, 1872*  
Note relating to the life and work of Galvani.  
—See also 894.

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The military telegraph and its use in different countries.

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Some notes on the development of electricity by friction.  
—See also 4267.

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Early work on thermo-chemistry.

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Mathematical paper on the principles of electrodynamics.  
—See also 1259.

1837. Jacobi, M(oritz Hermann) von. (1801-1874.) Eine galvanische Eisenreduktion unter Einwirkung eines kraeftigen elektromagnetischen Solenoids. (Mélanges Phys. Chim., Bull. Acad. Sc. St. Petersbourg, pp. 633-643.) 1 plate. 8vo.  
*St. Petersburg, 1872*  
Electrolytic reduction of iron.  
—See also 907.

1838. Jarrin, (Charles). (1813-1900.) Ampère, membre de la Société d'Émulation de l'Ain. 46 pp. 8vo. *Bourg, 1872*  
The author attributes to Ampère in 1822 the invention of the electric telegraph.

1839. Kohlrausch, F(riedrich Wilhelm Georg). Leitfaden der praktischen Physik, mit einem Anhange, das elektrische und magnetische absolute Maass-System. Second edition. xi+219 pp. 8vo.  
*Leipzig, 1872*  
Standard work on electrical measurements.

1839a.——(English translation.) An introduction to physical measurements, with appendices on absolute electrical measurements, etc. Translated from the Second German edition by Thomas Hutchinson Waller and Henry Richardson Proctor. xii+249 pp. 8vo.  
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1839b.——Second edition translated from the fourth German edition. xii+344 pp. 8vo.  
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1840. Ludewig, Julius. Die Telegraphie in staats- und privatrechtlicher Beziehung vom Standpunkte der Praxis und des geltenden Rechtes zur Orientierung fuer ausuebende Beamte und das den Telegraphen benutzende Publikum. viii+200 pp. 8vo.  
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—See also 1748.

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Experiments showing difference between the two kinds of electricity.

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General information on electrolysis, primary batteries, electro-magnetic induction, etc.

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*London, 1872*  
Practical instructions for use of seamen.

1846. **Schwendler**, (Carl) Louis. (1838-1882.) On differential galvanometers. (Journ. Asiatic Soc., Bengal, Vol. 41, part II., pp. 144-152; Vol. 42, part II., pp. 1-10.) 8vo.  
*Calcutta, 1872-1873*  
Conditions for maximum sensitiveness in using the differential galvanometer.  
—See also 1923, 2104, 2173, 3516.

1847. **Thomson**, (Sir) William (Lord Kelvin). (1824-1907.) Reprint of papers on electrostatics and magnetism. xv+592 pp. 8vo.  
*London, 1872*  
Collection of forty-two papers on mathematical and experimental physics.  
—See also 1085.

1848. **Ullrich**, Ladislaus, & Rudolf **Leutgeb**. Der elektrische Telegraph fuer die Armee im Felde. Ein Leitfaden zum Unterrichte in den Truppenschulen, bearbeitet nach den besten Quellen. 49 pp. ill. 9 plates. 8vo. *Vienna, 1872*  
Paper on the operation of the field-telegraph.

1849. **Waltenhofen**, (Adalbert Carl) von. Ueber die Erzeugung des elektrischen Kohlenlichtes mittelst Thermosaeulen. (Sitz. Ber. Boehm. Ges. Wiss., 1872, Abt. II., pp. 6-9.) 8vo.  
*Prague, 1872*  
Remarks on Noe's thermopile.  
—See also 1757.

1850. **Winter**, G. K. On the use of electro-magnetic instead of electrostatic induction in cable signalling. 5 pp. 12mo.  
*Brighton, 1872*  
The author's system of signaling dispenses with the use of condensers.  
—See also 1895, 3711.

1851. "Dyer" Intensity coils: How made and how used. Seventh edition. 53 pp. ill. 8vo. *London, 1872*  
Current electricity and the induction coil: general information; practical notes.

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1851a.—Eighth edition. 63 pp. ill. 8vo. *London, 1875*

1851b.—Second American edition from the eighth English edition. 123 pp. 16mo. *New York, 1883*

1852. **Althaus, Julius.** Treatise on medical electricity, theoretical and practical, and its use in the treatment of paralysis, neuralgia and other diseases. Third edition. xxviii+729 pp. ill. pl. 8vo. *London, 1873*  
Extensive work on the general principles of electricity, electro-physiology, electro-therapeutics, etc.  
—See also 1589.

1853.† **Ampère, André Marie.** (1775-1836.) The story of his love, being the journal and early correspondence with his family circle during the first republic, 1793-1804, edited by Madame H. C(heuvreux) from the French. vii+328 pp. 8vo. *London, 1873*  
A story which derives its interest from the scientific eminence of the hero.  
—See also 762.

1854. **Benoit, J(ean) René.** Études expérimentales sur la résistance électrique des métaux et sa variation sous l'influence de la température. 60 pp. 3 plates. 4to. (Thèse.) *Paris, 1873*  
Electric resistance of metallic conductors.

1854a.—(The same paper.) Abstract. (Comptes rendus Acad. Sc., Vol. 76, pp. 342-346.) 4to. *Paris, 1873*  
—See also 3287.

1855. **Bichat, E(rnest Adolphe).** (1845-1905.) Recherches sur la polarization rotatoire magnétique. 43 pp. 4to. (Thèse.) *Paris, 1873*  
Influence which the molecular condition (solid, liquid or gaseous), of a substance has on its magneto-optic rotatory power.

1856. **Brandely (A).** Nouveau manuel complet de galvanoplastique, ou, Traité pratique et simplifié des manipulations électro-chimiques appliquées aux arts et à l'industrie. 2 vols. ill. 16mo. (Manuels-Roret.) *Paris, 1873*  
Manual of electrotyping and electroplating.

1857. **Branly, Edouard.** Étude des phénomènes électrostatiques dans les piles. 52 pp. 4to. (Thèse.) *Paris, 1873*  
The electrical condition of the various parts of a circuit, also the e. m. f. of certain primary batteries.

1858. **Byrne, J(ohn).** Clinical notes on the electric cautery in uterine surgery. 68 pp. ill. 8vo. *New York, 1873*

1859. **Champion, (M. H.)** L'attraction. 69 pp. 8vo. *Lons-le-Saulnier, 1873*  
Theoretical views on the constitution of matter; structure of the atom; interstitial distribution of the ether.

1860. **Denza, Francesco.** (1834-1894.) Sulla possibile connessione tra le eclissi di sole ed il magnetismo terrestre. (Atti Accad. Nuovi Lincei, Vol. 26, pp. 427-451.) diagr. 4to. *Rome, 1873*  
Changes in magnetic declination registered at the observatory of Moncalieri during the period 1870-1873.

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1861. **Dippel**, (Leopold) and others. Die gesammten Naturwissenschaften, bearbeitet von Dippel, Gottlieb, Gurlt, Klein, Maedler, Masius, Moll, Nauck, Noeggerath, Quenstedt, Reclam, Reis, Romberg, Zech. Eingeleitet von Hermann Masius. Third edition. Vol. I. (Complete in 3 vols.) ill. pls. 8vo. *Esseen, 1873*

Work on general physics.

1862. **Domalip**, Karl. Ueber den Widerstand einer Kreisscheibe bei verschiedener Lage der Elektroden. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., Vol. 68, pp. 303-312.) 8vo. *Vienna, 1873*  
Resistance of a circular disc with regard to the position of the electrodes.  
—See also 3721.

1863. **Du Moncel**, Th(éodore Achille Louis). (1821-1884.) Notice sur les travaux scientifiques. 58 pp. 4to. *Paris, 1873*  
Account of the Du Moncel's scientific work.

1864.——Origine de l'induction. 25 pp. 8vo. *Caen, 1873*  
General considerations on electrostatic, magnetic and electro-magnetic induction.  
—See also 1223.

1865. **Gherardi**, Silvestro. (1802-1879.) Galvani. (Atti Accad. Sc., Istituto Bologna, 1873.) 6 pp. 8vo. *Bologna, 1873*  
Note on Galvani; some of his manuscripts; his studies and discoveries. (Autograph copy, dedicated to Prof. Buff.)  
—See also 894.

1866. **Haanel**, Eugene (Emil Felix Richard). Galvanometric method for the determination of the earth's magnetism and its oscillations. 44 pp. 6 plates. 8vo. (Inaugural dissertation.) *Breslau, 1873*  
Weber's method is used.

1867. **Haskins**, C(harles) H(amilton). The galvanometer and its uses. A manual for electricians and students. 76 pp. ill. 12mo. *New York, 1873*  
Electric measurements involving the use of the galvanometer; electrical memoranda.

1868. **Helmholtz**, (Hermann Ludwig Ferdinand). (1821-1894.) Vergleich des Ampère'schen und Neumann'schen Gesetzes fuer die elektro-dynamischen Kraefte. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., 1873, pp. 91-104.) 8vo. *Berlin, 1873*  
The potential-function applied to problems in electrodynamics.  
—See also 1259.

1869. **Hoskiaer**, (Otto) V(alemar). Guide for the electric testing of telegraph cables. viii+54 pp. 10 plates. 12mo. *London, 1873*  
The usual tests for conductivity, charge, insulation and faults with useful formulae.

1869a.——Second edition. viii+72 pp. pl. 12mo. *London, 1879*

1869b.——(French translation.) Guide des épreuves électriques à faire sur les câbles télégraphiques. Traduit sur la seconde édition anglaise par A. L. Ternant. 88 pp. ill. 8vo. *Paris, 1882*  
—See also 2085.

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1870. Jenkin, (Henry Charles) Fleeming. (1833-1885.) Electricity and magnetism. xii+379 pp. ill. 12mo. (Text-books of Science.) *London, 1873*  
Handbook containing theory and practice.  
—See also 1677.

1871. (Lacoiné, Émile.) Nouvelles méthodes pour déterminer les constantes voltaïques. (Journ. Télégr., Vol. 2, pp. 196-198.) 1 plate. 8vo. *Bern, 1873*  
Remarks on the determination of the electromotive force and internal resistance of a battery.  
—See also 1944, 2088, 3583.

1872. Maxwell, James Clerk. (1831-1879.) Treatise on electricity and magnetism. 2 vols. 20 plates. 8vo. (Clarendon Press Series.) *Oxford, 1873*  
This is the first edition of Clerk Maxwell's epoch-making work.

1872a.—Second edition. 2 vols. 20 plates. 8vo. (Clarendon Press Series.) *Oxford, 1881*  
The most important changes made in this edition are in the first nine chapters. It was prepared by W. D. Niven of Trinity College, Cambridge.  
—See also 2039, 2090, 2243, 3034.

1873. Mirel, G(ilbert). Télégraphe Hughes; album de 22 planches in quarto contenant 79 figures dont quatre vues d'ensemble de l'appareil en demi-grandeur, en plan, élévation, profil et vue perspective, et toutes ses pièces de détail en grandeur naturelle: suivi d'un texte explicatif. 55 pp. 22 plates. 4to. *Brest, 1873*  
Description of telegraph apparatus devised by Prof. Hughes.

1874. Pepper, John Henry. (1821-1900.) Chemistry, embracing the metals and elements which are not metallic. iv+144 pp. ill. 12mo. *London, (1873)*  
The outlines of the subject intended for the general reader.

1875.—Chemistry, electricity, light. iv+144+iv+146+iv+126 pp. ill. 8vo. *London, (1873-1876)*  
Elementary handbook. Prof. Pepper was, for many years, a popular expounder of science at the Polytechnic Institution, London.

1876.—Electricity, embracing voltaic, galvanic or dynamical electricity. 146 pp. ill. 12mo. *London, (1873)*

1877.—Heat, embracing thermometric heat, conduction of heat, latent heat, steam. 88 pp. ill. 12mo. *London, (1873)*  
Series of experiments admitting of popular demonstration.

1878.—Magnetism, embracing electro-magnetism, magneto-electricity, thermo-electricity, dia-magnetism, Wheatstone's telegraphs. 87 pp. ill. 12mo. *London, (1873)*  
Reproduced from the author's "Cyclopaedic Science simplified" (See No. 1751).  
—See also 1528.

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1879. **Perrin, Paul.** Étude sur les éclairs. 108 pp. 12mo. *Paris, (1873)*  
Explanation of the form and appearances of lightning based on the principles of mechanics.

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*New York, 1873*  
Simple instructions on the maintenance of lightning-rods.

1881. **Pierlot, Léon.** De la pile au bichromate de potasse. 19 pp. 4to.  
(Thèse.) *Paris, 1873*  
Remarks on the bichromate battery.

1882. **Ponzoni, B(eniamino) A.** Manuale pratico-elementare di telegrafia, ad uso degli aspiranti agli impieghi telegrafici governativi. Second edition. (2. edizione riveduta e corretta.) xiv+323 pp. 6 plates. ill. 12mo. *Milan, 1873*  
Elementary manual of telegraphy.  
—See also 1996.

1883. **Porro, I(gnazio).** (1795-1875.) "What is ether, electricity and its velocity." English translation. (A periodical excerpt.) 15 pp. 8vo. *London, 1873*  
"Matter in the state of extreme diffusion fills infinite space and constitutes what we call *ether*," p. 12.

1884. **Rota, Giuseppe.** Sulle gomene elettriche sottomarine. 56 pp. 8vo. (Inaugural dissertation.) *Turin, 1873*  
Selection of a cable route; laying the cable.

1885. **Sack, Joseph.** Der Druck-Telegraph Hughes in seiner jetzigen Gestalt. Speciell fuer Telegraphen-Beamte. 84 pp. 3 plates. 8vo. *Berlin, 1873*  
The Hughes telegraph and its operation.  
—See also 2100.

1886. **Sarratea, M. E. de.** Telegrafo Trasandino. Segunda memoria del directorio. Mayo 31, 1873. 50 pp. 8vo. *Valparaiso, 1873*  
Construction of a telegraph-line across the Andes.

1887. **Smith, Walter G(eorge).** Lectures on the clinical uses of electricity. 51+iii pp. 12mo. *Dublin, 1873*  
Four lectures given to medical students.

1888. **Ternant, A. L.** Télégraphie duplex. (Extract, Ann. Industr., 1873, Vol. 5.) 29 pp. ill. 8vo. *Paris, 1873*  
Brief history of duplex telegraphy; practical methods.

1889.—Transmission des signaux par câbles sous-marins. (Extract, Ann. Industr., 1873, Vol. 5.) 25 pp. 1 plate. 8vo.  
*Paris, 1873*  
Apparatus used for receiving cable-messages.  
—See also 1756.

1890. **Thomson, (Sir) William (Lord Kelvin).** (1824-1907.) On signalling through submarine cables, illustrated by signals transmitted through model submarine cable, exhibited by mirror

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galvanometer, and by siphon recorder. (Trans. Institut. Engin. & Shipbuilders, Sess. 16, pp. 1-2.) 8vo. Glasgow, 1873

Note on the electrostatic capacity of a submarine cable.

—See also 1085.

1891. Thomson, (Sir) William (Lord Kelvin) (1824-1907) & P(eter) G(uthrie) Tait. (1831-1900.) Elements of natural philosophy. Part I. 8vo. (Clarendon Press Series.) Oxford, 1873  
The object of this great work is to give an account of what is known of natural philosophy in language adapted to the non-mathematical reader, and at the same time to furnish mathematical students with a connected outline of the analytical processes involved.  
—See also 1085, 3650.

1892. Tibbits, Herbert. A handbook of medical electricity. xvi+149 pp. ill. 8vo. London, 1873  
Written for the medical practitioner.  
—See also 2180.

1893. Bogaert, Van der. La télégraphie électrique de campagne. Second edition. 84 pp. 4 plates. 12mo. Brussels, 1873  
The field-telegraph: its history and operation.

1894. Villari, Emilio. (1836-1904.) Sulla diversa tensione delle correnti elettriche indotte fra circuiti totalmente di rame od in parte di ferro. (Mem. Accad. Sc., Institut. Bologna, Ser. III, Vol. 4, pp. 449-462.) 4to. Bologna, 1873  
Remarks on the variable stage of a current when iron forms part of the circuit.  
—See also 1811.

1895. Winter, G. K. On duplex telegraphy; its application to land lines. 11 pp. 3 plates. 8vo. (London, 1873)  
The duplex system of Gintl (1853), Siemens, Stearns (1872); also the author's improvements.  
—See also 1850.

1896. Der Telegraph im Gebrauche des Publikums. Ein Ratgeber fuer Telegraphierende. Unter Benutzung der amtlichen Materialien. Herausgegeben von einem praktischen Telegrafen-Beamten. xii+174 pp. 12mo. Munster, 1873  
General information on the transmission of telegraph dispatches.

1897. Becker, Bernard H(enry). Scientific London. viii+340 pp. 8vo. London, 1874  
Chapter X. is devoted to the Society of Telegraph Engineers.

1898. Bouty, E(dmond Marie Léopold). Études sur le magnétisme. 48 pp. 4to. (Thèse.) Paris, 1874  
A new method of comparing the magnetic moment of small magnets; rupture of bar and cylindrical magnets; insufficiency of magnetic theories.  
—See also 2066.

1899. Buckmaster, J(ohn) C(harles). Elements of magnetism and electricity. Seventh edition. xxiii+204 pp. ill. 12mo. London, 1874  
Work for beginners.  
—See also 1590.

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1900. **Callaud**, A. Traité des paratonnerres, leur utilité, leur théorie, leur construction. viii+174 pp. ill. L. 8vo. *Paris, 1874*  
History, theory and construction of lightning-rods for buildings, ships and powder-magazines.  
—See also 1933.

1901. **Carvalho**, Maximiano de. Memoria sobre o fluido electro-dynamico applicado as cidades para as fazer saudaveis e florescentes. 25 pp. 8vo. *Rio de Janeiro, 1874*  
Considerations on the various properties of the electric current.

1902. **Clauson-Thue**, W. A B C universal commercial electric telegraphic code, specially adapted for the use of merchants, ship-owners, brokers' agents, etc. vii+224 pp. 8vo. *London, 1874*  
A business handbook.

1903. **Du Bois-Reymond**, (Emil Heinrich). (1818-1896.) Fortgesetzte Bemerkungen ueber astatiche Magnete. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., 1874, pp. 767-790.) 8vo. *Berlin, 1874*  
Remarks on the astatic system of magnetic needles. (See No. 1516.)  
—See also 1172.

1904. **Du Moncel**, Th(éodore Achille Louis). (1821-1884.) Détermination des éléments de construction des électro-aimants suivant les applications auxquelles on veut les soumettre. (Mém. Soc. Sc. Nat., Cherbourg, Vol. 18, pp. 265-303.) 8vo. *Cherbourg, (1874)*  
Application of certain empirical formulae used in the construction of electro-magnets.

1905.——Recherches sur les transmissions électriques à travers les corps ligneux. 21 pp.—Recherches sur la conductibilité électrique des corps ligneux et autres corps mauvais conducteurs. 9 pp. 4to. *Paris, 1874*  
Electrical conductivity of various kinds of wood.  
—See also 1223.

1906. **Edlund**, E(rik). (1819-1888.) Théorie des phénomènes électriques. (Mém. Acad. Sc., Stockholm, Vol. 12, No. 8.) 73 pp. 4to. *Stockholm, 1874*  
Researches bearing on electrical theory.  
—See also 1770.

1907. **Fonvielle**, W(ilfrid) de. De l'utilité des paratonnerres et de la nécessité de les controler. 36 pp. 12mo. *Paris, 1874*  
Remarks on the construction and protective function of lightning-rods.  
—See also 1675.

1908. **Gay-Lussac**, Louis Joseph (1778-1850) & C(laude) S(ervais) M(athias) **Pouillet** (1791-1868.) Instruction sur les paratonnerres, adoptée par l'Académie des Sciences. 1. Partie, 1823.

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M. G.-L. rapporteur. II. Partie, 1854. M. Pouillet, rapporteur.  
 III. Partie. M. Pouillet, rapporteur. vi+143 pp. ill. 12mo.  
*Paris, 1874*

These instructions relate to the erection and essential conditions of a good lightning-conductor with numerous diagrams and references to special buildings.

—See also 912.

1910. **Gloesener**, (Michael). (1794-1876.) *Études sur l'électro-dynamique*. Third edition. viii+179 pp. portr. 12mo. *London, 1874*  
 Monograph of the great English electrician by one who knew him well.  
 —See also 1832.

1910. **Gloesener**, (Michael). (1794-1876.) *Études sur l'électro-dynamique et l'électro-magnétisme. Importance du principe du renversement alternatif du courant dans les électro-aimants.* III pp. 8vo.  
*Brussels, 1874*  
 Telegraph instrument invented by the author together with other relevant matter.  
 —See also 1095.

1911. **Goldsmid**, (Sir) Frederic John. *Telegraph and travel: a narrative of the formation and development of telegraphic communication between England and India. With maps and illustrations.* xiv+673 pp. ill. maps. pl. 8vo. *London, 1874*  
 The Persian Gulf cable also the Russo-Persian lines. The volume contains a map showing the telegraph lines to India, 1874.  
 —See also 4604.

1912. **Hoffmann**, Friedrich Wilhelm. *Otto von Guericke, Buergermeister der Stadt Magdeburg; ein Lebensbild aus der deutschen Geschichte des XVIII. Jahrhunderts.* Herausgegeben von J. O. Opel. vi+250 pp. portr. 8vo. *Magdeburg, 1874*  
 Chapter on the work of von Guericke as a physicist.

1913. **Houzeau**, Louis. *Guide pratique pour l'emploi de l'appareil Morse, suivi du service de l'appareil à cadran et des indications relatives à l'entretien des piles.* 172 pp. ill. pl. 8vo.  
*Paris, 1874*

Written for the instruction of the telegraphist.

1914. **Huxley**, T(homas) H(enry). (1825-1895.) *Joseph Priestley.* (Macmillan's Mag., Vol. 36, pp. 473-485.) 8vo. *London, 1874*  
 Priestley's scientific work, his philosophy, and religious views being an address delivered by Prof. Huxley in Birmingham, August, 1874.

1915. **Lardner**, Dionysius. (1793-1859.) *Electricity, magnetism and acoustics.* xix+442 pp. ill. pl. 12mo. (Handbook of Natural Philosophy.) *London, 1874*  
 This volume contains a general elementary treatment of electrical and magnetic phenomena.  
 —See also 876.

1916. **Lloyd**, Humphrey. (1800-1881.) *Treatise on magnetism, general and terrestrial.* xv+239 pp. 3 plates. 8vo. *London, 1874*  
 The subject is thoroughly treated as far as elementary mathematics allows.  
 —See also 1023.

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1917. **Loomis, Elias.** (1811-1889.) Elements of natural philosophy. Fifth edition. 351 pp. ill. 8vo. *New York, 1874*  
The essentials of magnetism and electricity.  
—See also 1365.

1918. **Ludewig, Julius.** Der Reichstelegraphist. Ein Handbuch zum Selbstunterricht und zur Vorbereitung auf das Telegraphisten-examen, sowie zum Gebrauche fuer Telegraphenbeamte. xi+404 pp. ill. 2 maps. 8vo. *Leipzig, 1874*  
Practical treatise on telegraphy.  
—See also 1748.

1919. **Odstrcil, J.** Zur Erklaerung der periodischen Aenderungen der Elemente des Erdmagnetismus. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., Vol. 69, pp. 860-888.) 8vo. *Vienna, 1874*  
The periodical changes of the magnetic elements.

1920. **Orton, William.** (1826-1878.) A letter to the postmaster-general revising the recommendations of his annual report in favor of a postal telegraph. 38 pp. 8vo. *New York, 1874*  
What the government has done for telegraphs and railroads.  
—See also 5250.

1921. **Picardat, A(uguste Jean Baptiste).** Les mines dans la guerre de campagne. Exposé des divers procédés d'inflammation des mines et des pétards de rupture. Emploi de préparations pyrotechniques et emploi de l'électricité. 163 pp. ill. 12mo. *Paris, 1874*  
Batteries, magneto-exploders and fuses employed in firing mines and torpedoes.

1922. **Reverdito, G.** Morse e la sua telegraphia. 128 pp. pl. 12mo. *Monza, 1874*  
Brief history of telegraphic discovery with some details of the Morse system of transmission.

1923. **Schwendler, (Carl) L(ouis).** (1838-1882.) On the general theory of duplex telegraphy. (Jour. Asiatic Soc., Bengal, Vol. 43, pp. 1-2.) 8vo. *Calcutta, 1874*  
Theory and practice of the "bridge" method; also historical sketch.  
—See also 1846.

1924. **Siemens, (Ernst) Werner.** (1816-1892.) Beitraege zur Theorie der Legung und Untersuchung submariner Telegraphenleitungen. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., 1874, pp. 795-826.) 8vo. *Berlin, 1874*  
Additions to the theory of laying and testing submarine telegraphs.  
—See also 1214.

1925. **Stewart, Balfour.** (1828-1887.) Lessons in elementary physics. x+275 pp. ill. 1 plate. 16mo. *London, 1874*  
Manual of general physics.  
—See also 2428, 3149.

1926. **Stok, Johannes Paul van der.** Over energie bij elektriciteit. 48 pp. 8vo. *Utrecht, 1874*  
Electrical energy; a mathematical paper.

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1927. **Villari, E(milio.)** (1836-1904.) Ricerche sulle correnti interrotte ed invertite studiate nei loro effetti termici ed elettrodinamici. Memoria. 49 pp. 2 plates. 8vo. *Pisa, 1874*  
Increase of resistance arising from rapid reversal of the current.  
—See also 1811.

1928. **Watt, Alexander.** (1823-1892.) Electro-metallurgy practically tested. Fifth edition. viii+152 pp. ill. 12mo. (Weale's Rudimentary Series, No. 135.) *London, 1874*

1928a.—Sixth edition, with considerable additions. x+195 pp. 12mo. *London, 1877*  
—See also 2116, 3975.

1929. **Electric telegraph.** (British Quart. Rev., No. 118, pp. 438-470.) 8vo. *London, 1874*  
General article: the *C. M.* of the *Scots Magazine*, 1753 (See No. 378), is asserted on the authority of Brewster to be Charles Morrison and not Charles Marshall.

1930. **International correspondence by means of numbers.** 56 pp. 12mo. *London, 1874*  
The principal words in a language are represented by numbers.

1930+bis. **Ampère, André Marie** (1775-1836) and **Jean Jacques Ampère.** (1800-1864.) Correspondence et souvenirs. (1805-1864.) Recueillis par Madame H. C(heuvreux). 2 vols. 508 +461 pp. 12mo. *Paris, 1875*  
—See also 762.

1931. **Begbie, Elphinstone.** Description of an improved cryptograph. Third edition. 47 pp. pl. 12mo. *Madras, 1875*  
The first edition of this pamphlet on secret correspondence appeared in 1870.  
—See also 3754.

1932. **Brown, J. W.** Magnetacea, a new invention in curative magnetism. 31 pp. 12mo. *London, 1875*  
"The human frame absorbs magnetism as easily and naturally as the plant absorbs nourishment from the soil," p. 10.

1933. **Callaud, A.** Essai sur les piles. Second edition. viii+124 pp. 2 plates. 12mo. *Paris, 1875*  
Theory of the voltaic battery; the various batteries in common use and means to obtain the highest efficiency.  
—See also 1900.

1934. **Clark, Josiah Latimer.** (1822-1898.) Autobiographical notes. MSS. *1875-1889*  
These manuscript notes extend down to 1875. Born at Great Marlow, 1822; engineer to the Atlantic Telegraph Company, 1859; member of the Institution of Civil Engineers, 1861; Electrical Measurement published, 1868; the standard cell, 1873; elected Fellow of the Royal Astronomical Society, 1874; member of the Physical Society, 1875; President of the Society of the Telegraph Engineers (now Institution of Electrical Engineers), 1875; Chevalier de la Légion d'Honneur, 1881; Fellow of the Royal Society, 1889.  
—See also 1509.

1935. **Cook, John.** Magnetism and electricity. 108 pp. ill. 12mo. (Chambers's Elementary Science Manuals.) *London, 1875*  
A primer of the subject.

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1936. **Crystal, G.** Electricity. (Encyclopaedia Britannica, Ninth edition, pt. 29, pp. 3-105.) 4to. Edinburgh, (1875)  
A valuable treatise on electricity.

1937. **Culley, Richard Spelman & Robert Sabine.** (1837-1884.) On the pneumatic transmission of telegrams. 57 pp. 8vo.  
London, 1875  
Theoretical principles and technical details.  
—See also 1567, 1698.

1938. **Douglas, John Christie.** Manual of telegraph construction; the mechanical elements of electric telegraph engineering. xxiii+421 pp. 12mo.  
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Handbook of the principles and practice of civil engineering necessary for the telegraph engineer.

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Scientific American Article of Dec. 15, 1877.—14. Dolbear, Amos Emerson. Improvement in telephones. (U. S. Patent Office, Patent No. 199,041.) 2 pp. 1 plate, Jan. 8, 1878.—15. Berliner, Emile. Improvement in telephones. (U. S. Patent Office, Patent No. 199,141.) 2 pp. 1 plate, Jan. 15, 1878.—16. Edison's carbon telephone. (Journal of the telegraph, April 16, 1878; Scientific American Supplement, June 8, 1878.)—17. Edison, Thom. Alva. Improvement in speaking-telephones. (U. S. Patent Office, Patent No. 203,016.) 2 pp. 1 plate, April 30, 1878.—18. The carbon telephone. (Scientific American, June 8, 1878.)—19. Hughes, D. E. On the action of sonorous vibrations in varying the force of an electric current. Read before the Royal Society, London, May 9, 1878. (Scientific American Supplement, June 8, 1878.)—20. The Hughes telephone. (Scientific American Supplement, June 15, 1878; Engineering, London, May 20, 1878.)—21. M. Trouve's new telephone improvements. (Scientific American, June 22, 1878.)—22. Ayres, Brown. New arrangement for telephone. (Scientific American Supplement, July 6, 1878.)—23. Phelps, George M. Improvement in speaking-telephones. (U. S. Patent Office, Patent No. 209,289) 2 pp. 1 plate, Oct. 22, 1878.—24. Edison's recent telephonic inventions. (From Prescott's "Speaking Telephone, Electric Light, etc.") (Scientific American Supplement, Febr. 15, 1879.)—25. Bell, Alexander Graham. Improvement in electric speaking-telephones. (U. S. Patent Office, Patent No. 213,090) 4 pp. 1 plate, March 11, 1879.—26. Righi's telephone. (Scientific American, March 22, 1879.)—27. Improved microphones. (Frank Dowling's) (Scientific American, May 24, 1879.)—28. Edison's latest telephone. (Scientific American, Sept. 27, 1879, 1 plate.)—29. Phelps, George M. Improvement in speaking-telephones. (U. S. Patent Office, Patent No. 220,209) 2 pp. 1 plate, Sept. 30, 1879.—30. Extracts from Du Moncel's "The telephone." (American edition, 1879): M. Helle-sen's reaction telephone, pp. 83-84.—M. Trouve's system, pp. 99-100.—M. Demoget's system, p. 101.—Modifications in the arrangement of telephonic organs, pp. 102-104.—Different systems of microphones, pp. 146, 151-154.—31. The Blake transmitter. (Scientific American, Nov. 1, 1879.)—32. Eaton, Asahel K. Improvement in telephones. (U. S. Patent Office, Patent No. 222,475) 2 pp. 1 plate, Dec. 9, 1879.

The articles are typewritten (except 11 which are in printed form) and in cases where they had been accompanied by illustrations, these have been clipped and added to the different articles. The whole forms a handy volume in 4to.

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—See also 1586.

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—See also 1399.

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—See also 2400.

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*Brussels, 1877*

Mechanical and electrical details of the underground telegraph line between Halle and Berlin.

—See also 2266.

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2018. **Barrett**, W(illiam) F(letcher). On the electric telephone. (Proc. Roy. Dublin Soc., New Ser., Vol. 1, pp. 73-82.) ill. 8vo. *Dublin, 1877*  
Reis's telephonic work, p. 78.  
—See also 2063, 3489.

2019. **Beltrami**, Eugenio. (1835-1900.) Sulla determinazione sperimentale della densità elettrica alla superficie dei corpi conduttori. (Mem. Accad. Lincei, Vol. 1, pp. 491-502.) 4to. *Rome, 1877*  
Theory of a hemispherical proof-plane.

2020. **Bottomley**, J(ames) T(homson). Electrometers. 33 pp. ill. 12mo. (Science lectures at South Kensington.) *London, 1877*  
The quadrant and absolute electrometers of Lord Kelvin.  
—See also 4291.

2021. **Buchholtz**, F. H. Die Kriegstelegraphie. Hauptstadien ihrer Entwicklung. Das Feldtelegraphenmaterial. Einrichtung der Kriegstelegraphenlinien. Organisation der Militaertelegraphie in groesseren Armeen. Neuere Versuche mit portativen Feldtelegraphen. Bedeutung der Telegraphen fuer die Kriegsfuehrung. Ein Beitrag zur Kenntniss der Militaertelegraphie der Gegenwart. viii+96 pp. 3 plates. 8vo. *Berlin, 1877*  
The military telegraph: its history and development.

2022. **Clérault**, F. Note sur l'emploi des électro-sémaphores de MM. Lartigue, Tessé et Prudhomme pour la réalisation du block-system. 66 pp. 2 plates. 8vo. *Paris, 1877*  
Description of the Lartigue system of operating railway signals.

2023. **Du Moncel**, Th(éodore Achille Louis). (1821-1884.) Recherches expérimentales sur les maxima électro-magnétiques. 63 pp. 8vo. *Paris, 1877*  
Resistance of a magnetizing helix.

2024. ——Recherches sur la conductibilité électrique des corps médiocrement conducteurs et les phénomènes qui l'accompagnent. Second edition. (Ann. Chim. Phys., Vol. 10.) 146 pp. 8vo. *Paris, 1877*  
Conductivity of fibres, tissues and metallic filings.  
—See also 1223.

2025. **Edlund**, E(rik). (1819-1888.) Recherches sur les courants électriques produits par le mouvement des liquides. 44 pp. 8vo. *Stockholm, 1877*  
Electric currents due to the flow of water in cylindrical tubes.  
—See also 1770.

2026. **Evrard**, F(lorent). Notice sur l'emploi des poteaux métalliques dans les lignes télégraphiques. 46 pp. 2 plates. 8vo. *Brussels, 1877*  
Comparison of the different systems of metallic supports for telegraph lines.

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2027. **Fontaine**, Hippolyte. *Éclairage à l'électricité; renseignements pratiques.* xv+239 pp. ill. 8vo. *Paris, 1877*  
*DYNAMOS AND GENERATORS USED IN ELECTRIC LIGHTING; LIGHTHOUSE ILLUMINATION.*

2027a.——Second edition. vi+304 pp. ill. 8vo. *Paris, 1879*

2027b.——(English translation.) *Electric lighting. A practical treatise.*  
 Translated from the French by Paget Higgs. xvi+194 pp.  
 ill. 8vo. *London, 1878*  
 —See also 2381, 3936.

2028. **Fournier**, Edouard. (1819-1880.) *Le vieux-neuf, histoire ancienne des inventions et découvertes modernes.* Second edition. 3 vols. 12mo. *Paris, 1877*  
 Vol. I. contains history of the lightning-rod and early telegraphs; Vol. III. Some magnetic curiosities and myths.

2029. **Gardiner**, A(lfonso). *Elements of magnetism and electricity.* 96 pp. ill. 12mo. *London, (1877)*  
 A primer of electricity.

2030. **Gore**, George. *Art of electro-metallurgy, including all known processes of electro-deposition.* xx+391 pp. ill. 12mo. (Textbooks of Science.) *London, 1877*  
 Written for the student and practical worker; historical sketch of the subject.  
 —See also 1357.

2031. **Helmholtz**, (Hermann Ludwig Ferdinand). (1821-1894.) *Ueber galvanische Stroeme, verursacht durch Concentrations-Unterschiede; Folgerungen aus der mechanischen Waermetheorie.* (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., 1877, pp. 713-726.) 8vo. *Berlin, 1877*  
 The electric current caused by concentration differences; the mechanical equivalent of heat.  
 —See also 1259.

2032. **Johnston**, W(illiam) J(ohn). *Lightning flashes and electric dashes.* Containing short sketches and mirth-provoking anecdotes from all the principal telegraph writers of the day, with a very instructive and interesting history of Professor Morse and the telegraph, from the well-known pen of Benson John Lossing. 189 pp. ill. pl. L. 8vo. *New York, 1877*  
 A work of humor.  
 —See also 2199.

2033. **Langdon**, William Edward. ( ? -1905.) *Application of electricity to railway working.* xv+315 pp. ill. 5 plates. 12mo. *London, 1877*  
 Exposition of the principles involved in the electric protection of railway traffic and also the rules and regulations which should govern its practice.  
 —See also 3759.

2034. **Laurencin**, Paul. *Le télégraphe terrestre, sous-marin-pneumatique. Histoire, principes, mécanismes, applications, règlements, etc.* xi+494 pp. ill. map. 18mo. *Paris, 1877*  
 Short practical treatise for beginners.  
 —See also 1747.

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Observations on the direction and intensity of magnetic force in Ireland; theory of the compound magnetic needle; determination of the horizontal component in absolute measure; earth currents; magnetic chart of Ireland.  
—See also 1023.

2036. **McGregor, William.** Secret code for telegraphic messages. vi+90 pp. 8vo. *London, (1877)*  
—See also 1945.

2037. **Madsen, C(hristian) L(udwig).** Recherches sur la loi du mouvement télégraphique international. ix+68 pp. map, 10 tabl. 4to. *Copenhagen, 1877*  
The rôle of the telegraph in international and commercial relations.  
—See also 2386.

2038. **Mattei C(esare).** Spécifiques électro-homéopathiques; avec les indications nécessaires pour la guérison de toutes les maladies et spécialement des maladies incurables. Science nouvelle. 228 pp. 1 plate. 12mo. *Bologna, 1877*  
Short medical work containing a few applications of electricity for curative purposes.

2039. **Maxwell, (James) Clerk.** (1831-1879.) On the unpublished electrical papers of the Hon. Henry Cavendish. (Proc. Cambridge Philos. Soc., Vol. 3, pp. 86-89.) 8vo. *Cambridge, 1877*  
—See also 1872.

2040. **Melsens, (Louis Henri Frédéric).** (1814-1886.) Des paratonnerres à pointes, à conducteurs et à raccordements terrestres multiples; description détaillée des paratonnerres établis sur l'Hôtel de Ville de Bruxelles en 1865. vii+157 pp. 19 plates. L. 8vo. *Brussels, 1877*  
The author's system for the protection of the Brussels' Hotel de Ville with illustrations.  
—See also 3465.

2041. **Minchin, George M.** Treatise on statics, containing some of the fundamental propositions in electrostatics. xi+450 pp. 12mo. *London, 1877*  
Mathematical treatment of potential, electric density and tubes of force.

2042. **Moinet, I.** Levés des plans à la stadia, notes pratiques pour études des tracés. Third edition. 124 pp. 9 plates. 8vo. *Paris, 1877*  
Practical treatise on tacheometry.

2043. **Perry, John & W(illiam) E(dward) Ayrton.** The specific inductive capacity of gases. 15 pp. 4 plates. 8vo. *Yokohama, 1877*  
Details of method and results.  
—See also 1791, 3791.

2044. **Phillips, W. P. (Pseud. John Oakum.)** Oakum pickings; a collection of stories, sketches and paragraphs contributed from

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time to time to the telegraphic and general press by John Oakum. 188 pp. portr. 12mo. *New York, 1877*  
Humorous papers some of which are on telegraphic subjects.

2045. **Prescott, George B(artlett).** (1831-1894.) Electricity and the electric telegraph. vi+978 pp. ill. 1 plate. 8vo. *New York, 1877*  
Comprehensive, descriptive treatise.  
—See also 1497.

2046. **Reis, Paul.** (1828-1895.) Neue elektrische Maschinen, insbesondere die magnet-elektrischen Maschinen und deren Anwendungen. Drei Vortraege in der Rheinischen Naturforscher-Gesellschaft zu Mainz im Maerz 1877. 109 pp. ill. 8vo. *Leipzig, 1877*  
Some of the early dynamo machines.  
—See also 2098.

2047. **Riccardi, Pietro.** (1828-1898.) Sulle opere di Alessandro Volta, note bibliografiche. 40 pp. 4to. *Modena, 1877*  
List of 90 papers referring to the life and work of Volta.

2048. **Rogers, Fairman.** (1833-1900.) Magnetism of iron vessels with a short treatise on terrestrial magnetism. 125 pp. tab. 16mo. (Van Nostrand's Science Series, Vol. 30.) *New York, 1877*  
Practical manual for officers in the navy.

2049. **Smith, Willoughby.** (1828-1891.) Selenium: its electrical qualities and the effect of light thereon. 21 pp. 8vo. *(London), 1877*  
—See also 2006.

2050. **Spang, Henry W.** Practical treatise on lightning protection. 180 pp. ill. portr. 12mo. *Philadelphia, 1877*  
Atmospheric electricity, the functions of a lightning-conductor and its construction as applied to buildings, ships, oil-tanks, steam-boilers, etc.

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The author shows how a compass needle may be used for locating beds of iron ore.  
—See also 1558.

2052. **Thomson, (Sir) William (Lord Kelvin).** (1824-1907.) Report on (Elisha) Gray's electric telephone and multiple telegraph. 3 l. Folio. *Philadelphia, 1877*  
Sir William Thomson wrote this brief report as one of the judges of the Centennial Exposition, 1876.  
—See also 1085.

2053. **Volpicelli, P(aolo).** (1804-1879.) Sul piano di prova piccolissimo e non condensatore. (Mem. Accad. Lincei Cl. Sc. Fis. Mat. Nat., Ser. III, Vol. 1, pp. 174-178.) 4to. *Rome, 1877*  
Contribution to the theory of the proof-plane.

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2054.——Ad una obbiezione contro la teoria del Melloni sulla elettrostatica influenza. (Mem. Accad. Lincei, Cl. Sc. Fis. Mat. Nat., Ser. III, Vol. 1, pp. 481-490.) 4to. *Rome, 1877*  
On the charge which a proof-plane acquires under electrical influence. (See No. 1290.)

2055.——Alla nota del socio Giovanni Cantoni che ha per titolo su una nuova difesa della teorica di Melloni su la elettrostatica induzione. (Mem. Accad. Lincei, Cl. Fis. Mat.-Nat., Ser. III, Vol. 1, pp. 1005-1017.) 4to. *Rome, 1877*  
Defense of the author's views on the theory of the electrostatic condenser. (See No. 1290.)

2056.——Alla nota del socio G(iovanni) Cantoni contro la teorica di Melloni sulla elettrostatica induzione. (Mem. Accad. Lincei Cl. Sc. Fis. Mat. Nat., Ser III, Vol 1, pp. 1201-1246.) 4to. *Rome, 1877*  
Points in the theory of electrostatic induction. (See No. 1290.)  
—See also 1399.

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Chapters on the bed, the depth and temperature of the ocean with special reference to the work of the Challenger Expedition.

2058. Zetzsche, Karl Eduard. (1830-1894.) *Handbuch der elektrischen Telegraphie.* Vols. 1, 2, 3 Part I., 4 Part I. ill. pl. 8vo. *Berlin, 1877-1887*  
The electric telegraph in theory and practice.  
—See also 1632.

2059. Catalogue of the special loan collection of scientific apparatus in the South Kensington Museum. 1viii+1084 pp. ill. pl. 8vo. *London, 1877*  
Illustrations referring to the work of von Guericke, Newcomen and Watt, together with notes on historic apparatus.

2059bis. Telephone—Articles (3) relating to Philipp Reis and the invention of the telephone. 8vo. *1877*  
Preece on Reis. Report of the 47th meeting of the British Association Adv. Sc., Aug., 1877. On the telephone by W. H. Preece.—Ganot's description of Reis. Ganot's elementary treatise on physics, 8th ed. Translated by E. Atkinson, N. Y., 1877, p. 757.—Dolbear on Reis. The telephone, by A. E. Dolbear, 1877, pp. 99-116.  
—See also 1497bis.

2060. Ayrton, W(illiam) E(dward). Students' notes. 108+72 pp. ill. 3 plates. 4to. *(London, 1878)*  
Notes on voltaic electricity, electric testing and telegraph engineering.  
—See also 1791.

2061. Baille, J. *L'électricité.* Fourth edition. xii+318 pp. ill. 12mo. (Bibliothèque des Merveilles.) *Paris, 1878*  
Applications of electricity to lighting, to telegraphy and telephony popularly described.  
—See also 1817.

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*Paris, 1878*  
 Electric communication between moving trains.  
 —See also 5655.

2063. **Barrett**, W(illiam) F(letcher). On an experiment connecting electro-motive force and surface tension. (Proc. Roy. Soc. Dublin, Vol. 2, pp. 87-100.) 8vo.  
*Dublin, 1878*  
 A mercury contact breaker on the principle of the Lippmann's capillary electrometer.  
 —See also 2018.

2064. **Beard**, George M(iller) (1839-1883) & A(lphonso) D(avid) Rockwell. Practical treatise on the medical and surgical uses of electricity. Second edition, revised and enlarged. xxviii+794 pp. ill. 8vo.  
*New York, 1878*  
 —See also 2169, 3814.

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*Stuttgart, 1878*  
 Salient points in a course of 10 lectures on the principles of static and dynamic electricity.  
 —See also 1221.

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 Theory of potential, electrometers and electric energy.  
 —See also 1898

2067. **Brooks**, David. (1820-1891.) Atmospheric electricity. 14 pp. 8vo.  
*Philadelphia, 1878*  
 General considerations on atmospheric electricity; efficiency of lightning-rods.  
 —See also 1821.

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 The author's battery and its application to electric cautery.

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 Stray references to electric and magnetic phenomena.  
 —See also 1169.

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*Brussels, 1878*  
 Advantages of Wheatstone's automatic transmitter.  
 —See also 1717.

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volved in its action. With directions for making a speaking telephone. 127 pp. ill. 12mo. *London, 1878*  
 Construction and physics of the telephone.  
 —See also 2006bis, 2059bis, 5094.

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 Sailing compass consisting of two concentric, circular magnets.

2073. **Du Moncel, Th(éodore Achille Louis).** (1821-1884.) Le téléphone, le microphone et le phonographe. Second edition. 348 pp. ill. 12mo. (Bibliothèque des Merveilles.) *Paris, 1878*  
 Theory and general operation of the telephone.

2073a.——(English translation.) The telephone, the microphone and the phonograph. Authorized translation with additions and corrections by the author. x+363 pp. ill. 12mo.  
*London, 1879*  
 —See also 1223.

2074. **Everett, J(oseph) D(avid).** (1831-1904.) Report on atmospheric electricity. 14 pp. ill. 1 plate. 8vo. *London, 1878*  
 Theory of atmospheric electricity and results of observations.  
 —See also 1939.

2075. **Field, Kate.** The history of Bell's telephone. viii+67 pp. 12mo. *London, 1878*  
 General description of telephonic transmission.

2076. **Fournier, F(rançois) E(rnest).** Détermination immédiate de la déviation du compas par la nouvelle méthode des compas conjugués. Théorie et pratique. 44 pp. L. 8vo. *Paris, 1878*  
 Deviation determined from the readings of compasses: theory and practice.

2077. **Frick, J(oseph).** (1806-1875.) Physical technics; or, Practical instructions for making experiments in physics and the construction of physical apparatus with the most limited means. Translated by J(ohn) D. Easter. 467 pp. ill. 8vo.  
*Philadelphia, 1878*

2078. **Garner, S(amuel).** The telephone; its history, construction, principles and uses with definite instructions on the making of telephones by which failure is impossible; and to which is added a chapter on the phonograph. 32 pp. 12mo.  
*London, 1878*

2079. **Gavey, (John).** Insulators for aerial telegraph lines. 42 pp. 8vo. *(London), 1878*  
 Tables of resistance of various insulators.

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*Paris, 1878*  
 Short anecdotal account of Edison's inventions.

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2080 bis.—Le téléphone expliqué à tout le monde. 127 pp. 16mo.  
*Paris, (1878)*  
Interesting facts connected with the early days of the telephone.

2080 bis a.—Fifth edition. 135 pp. ill. 1 plate. 16mo.  
*Paris, (n. d.)*  
—See also 2144, 2192.

2081. **Gray, Elisha.** (1835-1905.) Experimental researches in electro-harmonic telegraphy and telephony, 1867-1878. 96 pp. ill. 8vo.  
*New York, 1878*  
The author's researches on the telegraphic transmission of musical and other sounds; also short autobiography.

2082.—Telephone. (Extract, Journ. Amer. Electr. Soc.) 24 pp. ill. 8vo.  
*Chicago, 1878*  
Musical tones transmitted electrically.  
—See also 4129.

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Commercial production of electric energy; also systems of electric lighting.

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*Greifswald, 1878*  
Contributions to the theory of influence machines with special reference to the one devised by the author.  
—See also 1982.

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Résumé of experience acquired in laying cables.  
—See also 1869.

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*Blackburn & London, 1878*  
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(Inaugural dissertation.) *Gottingen, 1878*  
Mathematical paper on the potential function.

2088. **Lacoine, Émile.** Notes sur les électro-aimants télégraphiques. (Bull. Soc. Sc. Industr., Marseille, 1877.) 8 pp. 8vo.  
*Marseille, 1878*  
Construction of electro-magnets for telegraph purposes; mathematical theory.  
—See also 1871.

2089. **Loring, A. E.** Hand-book of the electro-magnetic telegraph. 98 pp. ill. 16mo. (Van Nostrand's Science Series, No. 39.)  
*New York, 1878*  
Primer of the electric telegraph.

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2090. **Maxwell**, (James) Clerk. (1831-1879.) On the electrical capacity of a long narrow cylinder, and of a disk of sensible thickness. (Proc. London Mathem. Soc., Vol. 9, pp. 94-101.) 8vo.  
*London, 1878*  
A mathematical paper.  
—See also 1872.

2091. **Navez**, (Auguste Joseph Antoine). Discussion sur la théorie du téléphone entre Th. du Moncel et M. Navez. (Bull. Acad. Sc., Bruxelles, Vol. 45, pp. 416-425+612-618.) 8vo.  
*Brussels, 1878*  
Views of Du Moncel on the theory of the telephone controverted.

2092. **Niaudet**, Alfred. (1835-1883.) Téléphones et phonographes, étude complète de ces inventions. 176 pp. ill. 8vo.  
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Theory and use of the Reis and Bell telephones; Edison's phonograph.

2093.——**Traité élémentaire de la pile électrique**. xii+228 pp. ill. 8vo.  
*Paris, 1878*  
Theory and uses of primary batteries; Planté's secondary battery.

2093a.——(English translation.) Elementary treatise on electric batteries containing every form of battery now in use. Translated by L. M. Fishback, with an introduction by Geo. d'Infreville, electrician of the Western Union Telegraph Company. xi+266 pp. ill. 12mo.  
*New York, 1880*  
—See also 5616.

2094. **Pianta**, C(arlo). La elettricità ed il telegrafo: nozioni generali. 83 pp. 1 plate. 12mo.  
*Milan, 1878*  
General information on the working of the telegraph.

2095. **Pihl**, O(laf) A(ndreas) L(oeuwold). (1822-1895.) On magnets. xiv+135 pp. ill. 6 plates. 8vo.  
*Christiania, 1878*  
The law of force between magnets and their keeper with discussion of formulae.

2096. **Porter**, George. Magnetism and electricity for schools and science classes. 56 pp. ill. 12mo. (Elementary Science Manuals.)  
*London, 1878*

2097. **Prescott**, George B(artlett). (1831-1894.) The speaking telephone, talking phonograph and other novelties. 431 pp. ill. 8vo.  
*New York, 1878*  
The introduction contains a brief history of the subject.  
—See also 1497.

2098. **Reis**, Paul. (1828-1895.) Das Telephon und sein Anrufapparat nach seiner historischen Entwicklung und seiner praktischen Anwendung. Vortrag in Mainzer Vereinen im November und December 1877. 52 pp. ill. 8vo.  
*Mayence, 1878*  
Lecture on the history and operation of the telephone.  
—See also 2046.

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2099. **Rossetti**, Francesco. (1833-1895.) Relazione su alcune esperienze telefoniche. (Atti Istituto Veneto Sc., Ser. V, Vol. 4, pp. 567-577.) 8vo. *Venice, 1878*  
Speech transmitted through telephones one in the primary and the other in the secondary wire of an induction coil.  
—See also 2251.

2100. **Sack**, J(oseph). Die Telephonie, ihre Entstehung, Entwicklung und Verwerthung als Verkehrsmittel. 46 pp. ill. 8vo. *Berlin, 1878*  
Commercial development of the electric telephone.  
—See also 1885.

2101. **Samson**, (Pseud.: *i. e.*, J. A. Clippinger.) Sam Johnson; the experience and observations of a railroad telegraph operator. 177 pp. 8vo. *New York, 1878*  
Work of wit and humor.

2102. **Saward**, George. Trans-Atlantic submarine telegraph; a brief narrative of the principal incidents in the history of the Atlantic Telegraph Company. (With a preface by Harriet Saward.) 80 pp. 8vo. (Privately printed.) *London, 1878*  
Interesting account of the laying of the Atlantic cable of 1858.  
—See also 1534.

2103. **Schenk** (of Friedrichsdorf). Philipp Reis, der Erfinder des Telephon. 16 pp. ill. 8vo. *Frankfort, 1878*  
Claim of Philipp Reis to the invention of the electric telephone.

2104. **Schwendler**, (Carl) Louis. (1838-1882.) Instructions for testing telegraph lines and the technical arrangements of offices. Written on behalf of the Government of India, under the Orders of the Director-General of Telegraphs of India. Second edition. 2 vols. 8vo. *London & Edinburgh, 1878-1880*  
Details of the practical methods for testing in general use; their mathematical theory.

2105.——Précis of report on electric light experiments. 15 pp. Folio. *London, 1878*  
The experiments were made prior to the introduction of the electric light on railway stations in India.  
—See also 1846.

2105bis. **Scott de Martinville**, E. Léon. Le problème de la parole s'écrivant. La France, 1853-1861-1877. L'Amérique, 1877-1878. Première édition provisoire. 78 pp. 8vo. *Paris, 1878*  
—See also 2006bis.

2106. **Shoobred**, J(ames) N(ugent). On the present state of electric lighting. 27 pp. 2 plates. 8vo. *London, 1878*  
Short paper on generating machinery, lamps, regulators.  
—See also 2176, 3971.

2107. **Siemens**, (Sir) Charles William. (1822-1883.) Die Eisen- und Stahl-Industrie in England. Der Barometer. 83 pp. ill. 8vo. *Berlin, 1878*  
The deep-sea thermometer.

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2108.—On the utilization of heat and other natural forces. 32 pp. ill. 12mo. *London, 1878*  
General considerations on various forms of available energy.  
—See also 1654.

2109. **Stone, J. B.** Magnetic variation in the United States; being a compilation of observations made in America from the year 1640 to the present date; tabulated and arranged for the use of surveyors, with a brief account of the nature of terrestrial magnetism. 139 pp. 12mo. *New York, 1878*

2110. **Taylor, William B(ower).** (1821-1895.) An historical sketch of Henry's contribution to the electro-magnetic telegraph; with an account of the origin and development of Morse's invention. 103 pp. 8vo. (Extract, Smithsonian Report.) *Washington, 1878*  
Growth of the electric telegraph: Le Sage, Cavallo, Ronalds, Romagnosi, Soemmering; work of Cooke, Wheatstone and Morse; origin of the Morse alphabet; origin of the galvanometer.

2111. **Tegg, William.** (1816-1895.) Posts and telegraphs, past and present; with an account of the telephone and phonograph. xv+318 pp. 12mo. *London, 1878*  
Information on the electric telegraph; physics of the telephone.

2112. **Teufelhart, J(ohannes) N(epomuk).** Der Typenmultiplex von O. Schaeffler. 51 pp. 6 plates. 8vo. *Vienna, 1878*  
Description of Schaeffler's multiplex telegraph.

2113. **Towne, Eduard C(ornelius).** The causes of life, structure and species. 71 pp. 8vo. *Manchester, 1878*  
Considerations on the electromotive force of muscle.

2114. **Willigen, Volkert Simon Maarten van der.** (1822-1878.) Sur le magnétisme des aimants artificiels. (Arch. Musée Teyler, Vol. 4, pp. 133-320.) 1 plate. L8vo. *Harlem, 1878*  
Paper of 118 pages on the famous Harlem magnets; also on methods of making electromagnets.  
—See also 1304.

2115. **Volpicelli, Paolo.** (1804-1879.) Rettificazione delle formule dalle quali viene rappresentata la teorica fisico-matematica del condensatore voltaico. (Mem. Accad. Lincei Cl. Sc. Fis. Mat. Nat., Vol. 2, pp. 811-850.) 4to. *Rome, 1878*  
Theory of the electrostatic condenser.  
—See also 1399.

2116. **Watt, Alexander.** (1823-1892.) The microphone, with notes on the telephone and phonograph. 64 pp. 16mo. *London, (1878)*  
Popular exposition of the physical principles of the telephone and telegraph.  
—See also 1928.

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2117. **Watteville**, Armand de. Practical introduction to medical electricity with a compendium of electrical treatment; translated from the French by Dr. Onimus. xii+152 pp. ill. 8vo.  
*London, 1878*  
 Diffusion of the electric current through the animal system and its various effects.

2118. **Weber**, Wilhelm (Eduard). (1804-1891.) Elektrodynamische Maassbestimmungen, insbesondere ueber die Energie der Wechselwirksamkeit. (Abh. Saechs. Ges. Wiss. Math.-Nat. Kl., Vol. II, pp. 643-696.) 1 plate. 4to. *Leipzig, 1878*  
 Some aspects of the transformation of energy.  
 —See also 1110.

2119. **Zetzsche**, (Karl) Ed(uard). (1830-1894.) Ueber den Anteil Petrina's an der Erfindung des telegraphischen Gegensprechens. (Zeitschr. Math. Phys. Hist.-Litt. Abtl., Year 23, pp. 37-45.) 8vo.  
*Leipzig, 1878*  
 Petrina's share in the discovery of duplex telegraphy.  
 —See also 1632.

2120. All about the electric light, an illustrated guide to its production, cost and practical application. With descriptions of the various inventions now before the public. 112 pp. ill. 12mo.  
*London, (1878)*

2121. All about the telephone and phonograph. Containing descriptions of Bell's and Dolbear's telephones and Edison's phonograph; history of the discovery, details of construction, and interesting experiments. 99 pp. ill. 12mo. *London, (1878)*  
 A popular account of the two instruments.

2122. **O(lding), E(lizabeth) M(ary)**. Memoir of the late Alfred Smee by his daughter, with a selection from his miscellaneous writings. xiv+422 pp. ill. portr. pl. 8vo. *London, 1878*  
 General account of Smee's electro-metallurgical work; his battery, p. 16.

2123. Science lectures at South Kensington. 2 vols. 12mo.  
*London, 1878-1879*  
 Lectures on electrometers by J(ames) T(homson) Bottomley; electrical measurements by Prof. Carey Foster; thermal conductivity by Prof. Forbes, and polarized light by Dr. Spottiswoode.

2124. **Télégraphes et postes, transports à l'usage du public des receveurs des télégraphes, et des postes, des télégraphistes, électriciens et constructeurs de lignes électriques.** 342 pp. 12mo. .  
*Paris, 1878*  
 General information on telegraph matters.

2125. **The telephone: its wonders and lessons, a voice from the million;** with a preface by Prof. Bell. 31 pp. ill. 16mo.  
*London, (1878)*

2126. **Anderson**, Richard. Lightning conductors, their history, nature and mode of application. xv+256 pp. ill. L. 8vo.  
*London, 1879*  
 Description of the various methods that have been used together with a

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practical exposition of the systems actually employed; preceded by a history and followed by a bibliography of the subject.

—See also 2265, 3907.

2127. **Ayrton, W(illiam) E(dward).** Electricity as a motive power, discourse delivered to the working men of Sheffield. British Association. 27 pp. 8vo. *Sheffield, 1879*  
Notes of a popular lecture: Romagnosi (not Romagnesi) said to have discovered in 1802 that an electric current could produce mechanical motion. An electro-motor made in 1831 by the Paduan monk Salvator del Negro.  
—See also 1791.

2128. **Baird, Spencer F(ullerton).** (1823-1887.) Annual Report of the board of regents of the Smithsonian Institution. 1878. 8vo. *Washington, 1879*  
Biographical memoir of Joseph Henry by Prof. Asa Gray; "Henry and the Electric Telegraph," by William B. Taylor; researches in sound by Prof. Joseph Henry.

2129. **Box, Thomas.** Practical hydraulics, a series of rules and tables for the use of engineers. Fifth edition. viii+80 pp. tab. 12mo. *London, 1879*

2130. **Capron, J(ohn) Rand.** Aurora: their characters and spectra. xiv+207 pp. 18 plates. 4to. *London, 1879*  
History and physics of polar aurorae.

2131. **Caro, E(lme-Marie).** (1826-1887.) Diderot inédit d'après les manuscrits de l'Ermitage. (Rev. Deux Mondes, Vol. 36, pp. 566-610.) 8vo. *Paris, 1879*  
Allusion in 1762 to a form of *printing telegraph*; see footnote p. 567.

2132. **Cavendish, Henry.** (1730-1810.) Electrical researches, written between 1771 and 1781. Edited from the original manuscripts in possession of the Duke of Devonshire, by J(ames) Clerk Maxwell. lxxi+454 pp. ill. 8vo. *Cambridge, 1879*  
The collection contains the author's two papers published in the Philosophical Transaction of 1771 and 1776 together with considerations on the nature of electrification and also investigations in the mathematical theory of charged conductors.  
—See also 2462.

2133. **Clark, (Josiah) Latimer.** (1822-1898.) Notes from the letters and other papers of Sir William Fothergill Cooke. In connection with the invention of the electric telegraph, 1836-1875. 111 pp. Folio *(London,) 1879*  
The notes (manuscript) are arranged in chronological order.  
—See also 1509.

2134. **Clausius, R(udolph Julius Emmanuel).** (1822-1888.) Die mechanische Behandlung der Elektricität. (Die mechanische Waermetheorie. Vol. II.) xii+352 pp. 8vo. *Brunswick, 1879*  
The mechanical equivalent of the energy of certain electrical operations; a mathematical paper.  
—See also 1669.

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2135. **Coxworthy, Franklin.** Electricity the sole agent in creation. 4+15 pp. 12mo. *London, 1879*  
A few paragraphs on the sun; Laplace's theory; Jupiter's atmosphere.  
—See also 2833.

2136. **Daniel, L. S. & J(ames) D. Doyle.** The electric light, from its first to its most recent development. 36 pp. 8vo. *Melbourne, 1879*  
Generalities of the subject.  
—See also 4123.

2137. **Du Moncel, Th(éodore Achille Louis).** (1821-1884.) L'éclairage électrique. 316 pp. ill. pl. 12mo. (Bibliothèque des Merveilles.) *Paris, 1879*  
The early dynamos and arc-lamps.

2137a.—(English translation.) Electric lighting. Translated from the French by R. Routledge. xv+318 pp. ill. 12mo. *London, 1882*  
—See also 1223.

2138. **Evans, (Sir) F(rederic John Owen.)** (1816-1886.) Elementary manual for the deviation of the compass in iron ships, arranged in a series of questions and answers intended for the use of seamen and as an introduction and companion to the Admiralty manual for the deviations of the compass. Fourth edition. viii+143 pp. 3 plates. 8vo. *London, 1879*  
—See also 1545, 1703, 3543.

2139. **Everett, J(oseph) D(avid).** (1831-1904.) Units and physical constants. xvii+175 pp. 12mo. *London, 1879*  
Work indispensable in a physical laboratory.  
—See also 1939.

2140. **Ferrini, Rinaldo (Eugenio Domenico Tranquillo).** Technologie der Elektricität und des Magnetismus, zum Gebrauche fuer Techniker, Ingenieure, bei Vorlesungen zum Selbstunterricht. Unter Mitwirkung des Verfassers aus dem Italienischen von M. Schroeter. xii+576 pp. ill. 8vo. *Jena, 1879*  
Electricity and magnetism mathematically treated; also chapters on general telegraph testing.  
—See also 2281.

2141. **Fischer-Treuenfeld, R. von.** Kriegs-Telegraphie; geschichtliche Entwicklung, Wirkungskreis und Organisation derselben. ix+374 pp. ill. 2 plates, 2 plans. 8vo. *Stuttgart, 1879*  
The military telegraph, its history and operation.

2142. **Fornioni, Celso.** Le recenti meraviglie dell' elettricità e dell' acustica. 259 pp. port. ill. 12mo. *Milan, (1879)*  
Short notices of the telephone, telegraph and electric light.

2143. **(Garratt, B. Copson).** Magnetism, its natural relation to health and disease. 32 pp. 12mo. *London, 1879*  
Alleged principles of curative magnetism; treatment by magnetic appliance; pamphlet of doubtful utility.  
—See also 2191, 2230, 4065.

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2144. **Giffard**, Pierre. *La lumière électrique expliquée à tout le monde.* 160 pp. map, 1 plate. 16mo. *Paris, 1879*  
 Popular account of the early years of electric lighting.  
 —See also 2080.

2145. **Gordon**, J(ames) E(dward) H(enry). (1852-1893.) *Four lectures on static electric induction, delivered at the Royal Institution of Great Britain.* vi+146 pp. ill. 16mo. *London, 1879*  
 The lectures were given at the Royal Institution in 1879. Lecture III. contains description of the author's apparatus for the determination of dielectric capacity.

2145a.—(Another edition.) vi+146 pp. ill. 16mo. *New York, 1881*  
 —See also 2194, 2355, 2407, 3689.

2146. **Hands**, Joseph. *New views of matter, life, motion, and resistance; also an inquiry into the materiality of electricity, heat, light, colour and sound.* ix+538+xv pp. 8vo. *London, 1879*

2147. **Hasselberg**, (Klas) B(ernhard). *Ueber das durch elektrische Erregung erzeugte Leuchten der Gase bei niedriger Temperatur.* (Mém. Acad. Sc., St. Petersbourg, Ser. VII, Vol. 27.) 17 pp. ill. 4to. *St. Petersburg, 1879*  
 Light of Geissler tubes examined in connection with temperature.

2148. **Haswell**, Charles H(aynes). (1809-1907.) *Engineer's and mechanics' pocket-book.* 35th edition. 671 pp. 12mo. *New York, 1879*

2149. **Hedges**, Killingworth. *Useful information on practical electric lighting.* 55 pp. 8vo. *London, 1879*  
 Gas and the electric light; the generation, utilization and qualities of the electric light.

2149a.—Third edition, revised and enlarged. xii+150 pp. 1 plate. 12mo. *London, 1882*

2149b.—Fourth edition. xii+169 pp. 1 plate. 12mo. *London, 1882*  
 —See also 2325, 2432.

2150. **Hess**, Clemens. *Historische Notizen ueber die Entwicklung der elektrischen Influenzmaschinen und Theorie derselben unter Beruecksichtigung der Holtz'schen Maschinen.* 39 pp. 3 plates. 4to. (Programm.) *Frauenfeld, 1879*  
 Electrification by influence; historical sketch.

2151. **Higgs**, (Richard William Henry) Paget. *Electric light in its practical application.* viii+240 pp. ill. 8vo. *London, 1879*  
 Condensed account of the various dynamos and regulators used in electric lighting.

2152.—Electric transmission of power, its present condition and advantages. viii+87 pp. ill. 12mo. *London, 1879*  
 Brief description of early dynamos; comparative efficiencies.  
 —See also 3944.

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 Historical details; present usage.  
 —See also 4132.

2154. **Johnson**, Edward H. Statement as to the origin and development of the telephone. 42 pp. 8vo. *London, 1879*  
 The telephonic work of Gray, Edison and Bell discussed.

2155. **Klasen**, Ludwig. Die Blitzableiter in ihrer Construction und Anlage. iv+74 pp. ill. 8vo. *Leipzig, 1879*  
 Construction of lightning-conductors.

2156. **Kors**, J. De potential functie van geleidende vlakke platen onder influentie van eene electrische massa. 66 pp. pl. 4to. *Groningen, 1879*  
 Potential-function due to an attracting plate: a mathematical investigation with application to the influence of an electric charge.

2157. **Mach**, E(rnst) & S. **Doubrava**. Beobachtungen ueber die Unterschiede der beiden elektrischen Zustaende. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., Vol. 80, pp. 331-345.) 8vo. *Vienna, 1879*  
 Differences between positive and negative electricity as shown by Lichtenberg's dust figures; Lullin's experiment on the perforation of cards by the discharge of a Leyden jar.  
 —See also 1442.

2158. **Merling**, A. Die Telegraphen-Technik der Praxis im ganzen Umfange zum Gebrauch fuer den Unterricht fuer Bau- und Maschinen-Ingenieure, Telegraphen- und Eisenbahn-Techniker, Mechaniker, Militaer-Ingenieure, und fuer die der Militaer-Telegraphie nahestehenden Personen bearbeitet. xi+764 pp. ill. 1 map, 2 plates. 8vo. *Hanover, 1879*  
 Manual of telegraph engineering.  
 —See also 2289.

2159. **Oekonomides**, G. Einige Worte ueber das Wesen der Elektricitat und des Magnetismus. 40 pp. 8vo. *Tubingen, 1879*  
 General remarks on magnetism and electricity.

2160. **Overend**, James. Description of elementary experiments in magnetism and electricity. 76 pp. ill. 12mo. *Edinburgh, 1879*

2161. **Paterson**, Edward. Electric signals; with an explanation of the principles on which they are constructed and full instructions for their fixing and maintenance. 32pp. ill. 8vo. *London, 1879*  
 Written for the use of bell-fitters.

2162. **Planté**, (Raymond Louis Gaston). (1834-1889.) Recherches sur l'électricité. 271 pp. ill. 8vo. *Paris, 1879*  
 Description of the author's secondary battery; experiments with powerful storage batteries.  
 —See also 2425, 3199.

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2163. **Pope**, Frank(lin) L(eonard). (1840-1895.) Life and work of Joseph Henry. (Extract, *Journ. Amer. Electr. Soc.*) 31 pp. portr. ill. 8vo. *New York, 1879*  
 (Autograph copy, dedicated to Josiah Latimer Clark.)  
 —See also 1753.

2164. **Prescott**, George Bartlett. (1831-1894.) Farmer on the electric light. (Extract, *The Speaking Telephone.*) 17 pp. 8vo. *Newport, 1879*  
 Account of the work of Moses G. Farmer in electric lighting.

2165.——The speaking telephone, electric light, and other recent electrical inventions. ii+616 pp. ill. pl. 8vo. *New York, 1879*  
 Recent and useful applications of electricity described and illustrated.  
 —See also 1497.

2166. **Reid**, James D. The telegraph in America; its founders, promoters and noted men. xiii+846 pp. ill. portr. 8vo. *New York, 1879*  
 Memorial volume commemorating the inauguration of a statue to Prof. Morse in New York City. History of prominent inventors and important American telegraph companies. (This is the second title-page. The first title-page reads: The telegraph in America and Morse memorial, and in memoriam W. Orton.)  
 —See also 3892.

2167. **Riecke**, (Karl Victor) E(duard). Ueber das ponderomotorische Elementargesetz der Elektrodynamik. (Abh. Ges. Wiss., Goettingen, Vol. 24, pp. 1-68.) 4to. *Gottingen, 1879*  
 Six mathematical papers on electrodynamical subjects.

2168. **Riess**, Peter Theophil. (1804-1883.) Abhandlungen zu der Lehre von der Reibungselektricitat. Vol. II. iv+195 pp. 1 plate. 8vo. *Berlin, 1879*  
 Study of electrical influence and of the efficiency of the Holtz machine in particular; also atmospheric electricity and the function of lightning-rods. (Vol. I. published in 1867.)  
 —See also 862.

2169. **Rockwell**, A(lphonso) D(avid). Lectures on electricity in its relations to medicine and surgery. 99 pp. ill. 8vo. *New York, 1879*  
 Introductory lecture on elementary electricity; electro-medical apparatus described and illustrated.  
 —See also 2064.

2170. **Schellen**, (Thomas Joseph) H(einrich). (1818-1884.) Die magnet- und dynamo-elektrischen Maschinen, ihre Entwicklung, Construction und praktische Anwendung. x+333 pp. ill. 8vo. *Cologne, 1879*  
 The early magneto-machines, dynamos and arc-lamps written for the non-mathematical reader.

2170a.——Die neuesten Fortschritte auf dem Gebiete der elektrischen Beleuchtung und der Kraftuebertragung. Ein Anhang zu

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dem Werke desselben Verfassers: "Die Magnet- und dynamo-elektrischen Maschinen, etc." pp. 336-426. ill. 8vo.

Cologne, 1880

2170b.——Die magneto- und dynamo-elektrischen Maschinen, ihre Construction und praktische Anwendung zur elektrischen Beleuchtung. Second edition. (Zweite nach dem gegenwaertigen auf der Pariser elektrischen Ausstellung vertretenen Zustande dargestellte und vermehrte Auflage.) xv+656 pp. 8vo.

Cologne, 1882

2170c.——(English translation.) Magneto-electric and dynamo-electric machines, their construction and practical application to electric lighting and the transmission of power. Translated from the third German edition by Nathaniel S. Keith and Percy Neymann, with large additions and notes relating to American machines. Vol. I. ill. 8vo. New York, 1884

—See also 1069.

2171. **Schulze**, F. W. On periodical change of terrestrial magnetism; read before the North China branch of the Royal Asiatic Society on June 14th, 1878. 64 pp. ill. 8vo.

Shanghai & London, 1879

The revolution of the magnetic pole round the geographic is held to be caused by attraction between heavenly bodies and the earth's fiery, liquid interior; numerous quotations and references of interest.

2172. **Schwartz**, F(riedrich) L(eberecht) W(ilhelm). (1821-1899.) Wolken und Wind, Blitz und Donner. Ein Beitrag zur Mythologie und Culturgeschichte der Urzeit. xxvii+207 pp. 8vo. (Vol. II of Die Poetischen Naturanschauungen der Griechen, Roemer und Deutschen in ihren Beziehungen zur Mythologie.)

Berlin, 1879

Contribution to the physics of clouds, storms, lightning and thunder.

2173. **Schwandler**, (Carl) Louis. (1838-1882.) On a new standard of light. (Journ. Asiatic Soc., Bengal, Vol. 48, part 2.) 94 pp. 1 plate. 8vo.

Calcutta, 1879

The standard suggested is a small incandescent platinum loop.

—See also 1846.

2174. **Scudder**, Samuel H(ubbard). Catalogue of scientific serials of all countries, including the transactions of learned societies in the natural, physical and mathematical sciences, 1633-1876. xii+358 pp. 8vo.

Cambridge, 1879

A valuable bibliography.

2175. **Seelhorst**, Georg. Katechismus der Galvanoplastik. Ein Handbuch fuer das Selbststudium und den Gebrauch in der Werkstatt. Second edition. (Zweite vollstaendig umgearbeitete Auflage.) xii+192 pp. ill. 1 plate. 12mo. (Weber's Katechismen, No. 62.)

Leipzig, 1879

Elements of electroplating with description of apparatus.

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2176. **Shoobred, J(ames) N(ugent).** Electric lighting and its practical application with results from existing examples. iv+108 pp. 5 plates. 12mo. *London, 1879*  
Historical and descriptive notice of electric lighting.  
—See also 2106.

2177. **Siemens, (Sir) Charles William.** (1822-1883.) Einige wissenschaftlich-technische Fragen der Gegenwart. 105 pp. 4 plates. 8vo. *Berlin, 1879*  
Methods of measuring and controlling currents; transmission of electric energy.  
—See also 1654.

2178. **Smith, Willoughby.** (1828-1891.) Working of long submarine cables. 45 pp. ill. pl. 8vo. *London, 1879*  
Paper read before the Society of Telegraph Engineers, Febr. 12, 1879.  
—See also 2006.

2179. **Snellen, (Maurits).** (1840-1907.) Le télémétéorographe d'Ol-land. 31 pp. 1 plate. 8vo. *Harlem, 1879*  
Self-registering meteorograph, illustrated description.

2180. **Tibbits, Herbert.** How to use a galvanic battery in medicine and surgery, a discourse delivered before the Hunterian Society. Second edition, revised and incorporating three lectures upon electro-therapeutics, delivered by the author at the West-End-Hospital. 76 pp. ill. 8vo. *London, 1879*  
—See also 1892.

2181. **Toy, Edmund P.** Easy lessons in electricity. iv+63 pp. ill. 12mo. (Stewart's Educational Series.) *London, 1879*

2182. **Tyndall, John.** (1820-1893.) Light and electricity; notes of two courses of lectures before the Royal Institution of Great Britain. 194 pp. 12mo. *New York, 1879*  
—See also 1586.

2183. **Wheatstone, (Sir) Charles.** (1802-1875.) Scientific papers, reprinted and published for the Physical Society of London. xiii+380 pp. 21 plates. 8vo. *London, 1879*  
Papers on sound; the duration of the electric spark.  
—See also 1564, 2585.

2184. **Arthuis, A(rthur).** Traitement des maladies nerveuses, affections rhumatismales, maladies chroniques. Third edition. 151 pp. ill. 8vo. *Paris, 1880*  
Work on electro-therapeutics; treatment of special cases.  
—See also 2222.

2185. **Bernstein, Alex(ander).** Die elektrische Beleuchtung. 80 pp. ill. 8vo. *Berlin, 1880*  
Various methods of electric illumination considered.

2186. **Breguet, Antoine.** (1851-1882.) La machine de Gramme, sa théorie et sa description. 77 pp. ill. 8vo. *Paris, 1880*  
Elementary theory of the Gramme machine explained with numerous illustrations. Established the principles of the magnetic circuit.  
—See also 3990.

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2187. Chrystal, (George). On the differential telephone. (Trans. Roy. Soc., Edinburgh, Vol. 29, pp. 609-636.) 4to. *Edinburgh, 1880*  
Description and uses of a differential telephone together with the mathematical theory of the instrument.  
—See also 4353.

2188. Colladon, (Jean) D(aniel). (1802-1893.) Notes sur les inconvénients et les difficultés du tunnel étudié sous le Mont-Blanc et de ses lignes d'accès projetées. Avantages incontestables d'un chemin de fer international par le Simplon. 68 pp. 1 plate. 8vo. *London, 1880*  
An engineering study; the relative advantages of the Mont Blanc and Simplon tunnels, preliminary work.  
—See also 1825.

2189. Crompton, R(ookes) E(velyn Bell). The electric light for industrial uses. 41 pp. 1 plate. 8vo. *London, 1880*  
General information for an intending user of electric light.  
—See also 2229, 4175.

2190. Frost, A(lfred) J(ames). (1844-1881.) Biographical memoir of Francis Ronalds. 23 pp. 8vo. *London, 1880*  
Reprinted from the Ronalds' catalogue. (See No. 2207.)  
—See also 2207, 3937.

2191. Garratt, B. Copson. The true philosophy of health and healing illustrated by the uniform success of curative magnetism. 31 pp. 12mo. *London, 1880*  
Popular paper on curative magnetism.  
—See also 2143.

2192. Giffard, Pierre. La téléphonie domestique. 117 pp. 16mo. *Paris, 1880*  
Simple account of the telephone written for the general reader.  
—See also 2080.

2194. Gordon, J(ames) E(dward) H(enry). (1852-1893.) Physical treatise on electricity and magnetism. 2 vols. ill. pl. 8vo. *London, 1880*  
Details of important electric and magnetic measurements made by the author.  
—See also 2145.

2195. Heilemann, F. J. Der Blitzableiter, das neueste ueber dessen Herstellung und Sicherheit bringende Anwendung. Wichtig fuer Baumeister und Fachleute, sowie fuer jeden Haus- und Landwirth. Nebst einer Abhandlung ueber Elektricitat. 36 pp. ill. 8vo. *Gorlitz, 1880*  
Notes on the velocity of electrical transmission; thunderstorms; lightning rods.

2196. Helmholtz, (Hermann Ludwig Ferdinand) (1821-1894), (Gustav Robert) Kirchhoff (1824-1887) and Ernst Werner Siemens (1816-1892). Verhandlungen der Kgl. Preussischen Akademie ueber die Blitzableiter. (Extract, Monatsbericht, Kgl. Preuss. Akad. Wiss. 1876-1880.) 27 pp. 8vo. *Berlin, 1880*  
Paper on lightning conductors.  
—See also 1214, 1259, 1548.

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2197. **Hoffmeyer**, N(iels). (1836-1884.) Étude sur les tempêtes de l'Atlantique septentrional et projet d'un service télégraphique international relatif à cet océan. 54 pp. 7 maps. 8vo.  
*Copenhagen, 1880*  
 Necessity of meteorological stations on the Faroe Islands, Iceland and Greenland.

2198. **Holtz**, W(ilhelm Theodor Bernhard). Ueber die Zunahme der Blitzgefahr und ihre vermutlichen Ursachen. Eine Statistik der Gewitter, der Blitzeinschläge in Gebaeude, der blitzbezüglichen baulichen Einrichtungen und der Verluste durch Blitz, auf Grund zahlreicher Mittheilungen aus Deutschland, Oesterreich und der Schweiz. 158 pp. 8vo. *Greifswald, 1880*  
 Destruction of life and property by lightning.  
 —See also 1982.

2199. **Johnston**, W(illiam) J(ohn). Telegraphic tales and telegraphic history, a popular account of the electric telegraph, its uses, extent and outgrowths. 254 pp. 12mo. *New York, (1880)*  
 —See also 2032.

2200. **Jones**, John. The sun a magnet. 44 pp. ill. 12mo.  
*Dundee, 1880*  
 Among subjects treated are: the general structure of the sun, star-twinkling, comets' tails. The author's views are somewhat startling.

2201. **Levander**, F(rederick) W(illiam). Solutions of the questions in magnetism and electricity, set at the preliminary scientific and first B. Sc. pass examinations of the University of London, from 1860 to 1879, together with definitions, dimensions of units, miscellaneous examples, etc. 94 pp. ill. 12mo.  
*London, 1880*  
 Useful for College and University students.

2202. **Maigne**, W. Nouveau manuel complet du fabricant d'objets en caoutchouc, gutta-percha, gomme factice, toile et taffetas cirés, suivi de l'imperméabilisation des étoffes, papiers, cuirs etc. 2 vols. 3 plates. 16mo.  
*Paris, 1880*  
 Practical handbook for the manufacture of gutta percha.

2203. **Mercadier**, E. Traité élémentaire de télégraphie électrique, leçons faites à l'administration centrale des télégraphes à l'usage des auxiliaires. 261 pp. ill. 12mo. *Paris, 1880*  
 The elements of telegraphy.

2204. **Molesworth**, (Sir) Guillford L(indsey). Pocket-book of useful formulae and memoranda for civil and mechanical engineers. 20th edition. viii+610 pp. ill. 32mo. *London, 1880*

2205. **Morton**, Henry. (1836-1902.) Reports on the topophone and the electric light. (Annual Report, Light-house Board, Append.) 50 pp. ill. 8vo.  
*Washington, 1880*  
 The topophone was devised for the purpose of aiding navigators in determining the position of distant fog-signals. Arc and incandescent lighting considered.  
 —See also 2292.

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2206. **Pelletier, A. L. & Taupin d'Auge.** La pose et l'entretien des sonneries électriques mises à la portée de tout le monde. 72 pp. ill. L. 8vo. *Paris, 1880*  
Practical paper on the installation and maintenance of electric bells.

2207. **Ronalds, (Sir) Francis.** (1788-1873.) Catalogue of books and papers relating to electricity, magnetism, the electric telegraph, etc., including the Ronalds library; with a biographical memoir of the author, edited by Alfred J. Frost. xxvii+564 pp. 8vo. *London, 1880*  
Catalogue compiled by Sir Francis Ronalds and edited by Alfred J. Frost who died in 1881 at the early age of 38. It contains 13,000 entries with numerous notes, historical and critical; also biographical notice of Sir Francis Ronalds. (See Nos. 3937, 5505, 5667a.)  
—See also 803, 2190.

2208. **Saavedra, Antonino Suarez.** Tratato de telegraphia. Vol. I. Historia universal de la telegraphia. Second edition, revised and enlarged. 656 pp. ill. 8vo. *Barcelona, 1880*  
Historical and practical handbook. On p. 110, the C. M. of the Scots Magazine is said to be Charles Marshall. (See No. 378.)

2209. **Scharnweber, L.** Die elektrische Haustelegraphie. Handbuch fuer Techniker, Mechaniker und Bauschlosser. 125 pp. ill. 8vo. *Berlin, 1880*  
General information on telegraphy and telephony.

2211. **Sleeman, C(harles) W(illiam).** Torpedoes and torpedo warfare, containing a complete and concise account of the rise and progress of submarine warfare; also a detailed description of all matter appertaining thereto, including the latest improvements. viii+309 pp. 5 plates. L. 8vo. *Portsmouth, 1880*  
Practical information on submarine mines and methods of firing them.

2212. **Somzée, Léon.** Nouveau procédé d'éclairage électrique. 22 pp. 1 plate. 8vo. *Schaerbeek, 1880*  
Finely divided particles of carbon used instead of pencils or filaments for electric lighting.

2213. **Spon, Ernest.** Supplement to Spon's Dictionary of engineering, civil, mechanical, military and naval. (Letter Co. to In.) ill. L. 8mo. *London, 1880*  
A number of electrical articles.  
—See also 2392, 4103.

2214. **Swan, J(oseph) W(ilson).** Electric lighting. 24 pp. 1 plate. 8vo. *Newcastle-upon-Tyne, 1880*  
Progress made in electric lighting during the period 1878-1880. General advantages of the incandescent light, its division, subdivision and measurement.  
—See also 4202.

2215. **Thayer, Ella Cheever.** Wired love; a romance of dots and dashes. 256 pp. 12mo. *New York, 1880*

2216. **Urquhart, J(ohn) W.** Electric light, its production and use embodying plain directions for the working of galvanic bat-

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teries, electric lamps and dynamo-electric machines, edited by F. C. Webb. xiv+290 pp. ill. 12mo. *London, 1880*

2217.——Electro-plating, a practical handbook including the practice of electro-typing. viii+216 pp. ill. 1 plate. 12mo. *London, 1880*

Compact practical handbook.  
—See also 2302.

2218. **Wilson, Frederik J(ohn) F(arlow).** Stereotyping and electro-typing, a guide for the production of plates by the papier-mâché and plaster processes; with instructions for depositing copper by the battery or by the dynamo machine, also hints on steel and brass facing. xv+195 pp. ill. pl. 12mo. (Wyman's Technical Series.) *London, 1880*  
The second part contains a brief history of electrolytic deposition, also details of various processes used.

2219. **Zetzsche, (Karl) Eduard.** (1830-1894.) Geschichte und Entwicklung des elektrischen Fernsprechwesens. Second edition. 64 pp. ill. 8vo. *Berlin, 1880*  
History and operation of the electric telephone.  
—See also 1632.

2220. **Allard, É(mile).** Mémoire sur les phares électriques, comprenant le programme de l'éclairage électrique des côtes de France complété par des signaux sonores à vapeur. xiii+87 pp. 8 maps. 8 plates. 4to. *Paris, 1881*  
Electric light in coast illumination; generators used; optical apparatus; maps and illustrations.  
—See also 5467.

2221. **Armengaud, Jacques Eugène. (Senior.)** (1810-1891.) Manuel de l'éclairage électrique. Sources et générateurs d'électricité. Lampes et régulateurs. Éclairage par incandescence et par arc voltaïque. Division et distribution de la lumière. vi+232 pp. 12mo. *Paris, 1881*  
Dates of patents and short description of electric generators, glow lamps, arc lamps, etc.

2222. **Arthuis, A(rthur).** L'électricité statique et l'hystérie; mémoire précédé d'une lettre à M. le professeur Charcot. 72 pp. 8vo. *Paris, 1881*  
History of the application of static electricity to medical cases; details of the author's work.  
—See also 2184.

2223. **Avenarius, (Michael Petrowitsch).** Méthode pour la division de la lumière électrique. 4 pp. 1 plate. 4to. *Paris, 1881*  
A brief note on the subdivision of the electric light.

2224. **Bede, É(mile).** La téléphonie. Histoire, description et application des téléphones. 114 pp. 8vo. *Brussels, 1881*  
Popular account of the various telephone systems.  
—See also 4842.

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2225. **Bell, Alexander Graham.** Upon the production of sound by radiant energy. Paper read before the National Academy of Sciences, April 21, 1881. 45 pp., including 11 plates. 8vo.  
*Washington, 1881*  
 The photophone; production of sound by light with numerous illustrations.  
 —See also 1967bis, 2006bis, 2125, 2268, 3867.

2226. **Blavier, É(douard) E(rnest).** (1826-1887.) Des grandeurs électriques et de leur mesure en unités absolues. 587 pp. ill. 1 plate. 8vo.  
*Paris, 1881*  
 Determination of the ohm and other units together with relevant physical and mathematical matter.  
 —See also 1381.

2227. **(Boggett, William.)** Thoughts on the source of life; also recent speculations on electricity, and other subjects. By an octogenarian. 42+8 pp. 8vo.  
*London, 1881*  
 The author suggests the view that electricity is the active principle of life, p. 9.  
 —See also 2347, 2380, 2404, 2430, 2434.

2228. **Cazin, A(chille Auguste).** (1832-1877.) Traité théorique et pratique des piles électriques, mesure des constantes des piles, unités électriques, description et usage des différentes espèces de piles; annoté et publié par Alfred Angot. vi+311 pp. ill. 8vo.  
*Paris, 1881*  
 Primary batteries and thermopiles.  
 —See also 3336.

2229. **Crompton, R(ookes) E(velyn) B(ell).** Artificial lighting in relation to health. 27 pp. 8vo.  
*London, 1881*  
 Points in the physics of electric lighting.  
 —See also 2189.

2230. **Garratt, B. Copson.** Magnetism and electricity, their curative properties explained. 20 pp. 8vo.  
*London, 1881*  
 It is held that magnetism has in many cases exercised a marvelous control over mental as well as physical troubles.  
 —See also 2143.

2231. **Giacomini, Ferdinando.** Circuiti telegrafici; breve trattato di telegrafia elettrica con unito Atlante di diciotto tavole. Second edition. 100 pp. 12mo+Atlas=18 tables. 4to.  
*Milan, 1881*  
 Short description of telegraphic manipulation with numerous plates.

2232. **Helmholtz, (Hermann Ludwig Ferdinand).** (1821-1894.) Ueber die auf das Innere magnetisch oder dielektrisch polarisirter Körper wirkenden Kraefte. (Sitz. Ber. Akad. Wiss. Math-Nat. Kl., 1881, pp. 191-213.) 8vo.  
*Berlin, 1881*  
 Contribution to the mathematical theory of magnetism.  
 —See also 1259.

2233. **Hirn, G(ustav) A(dolph) (1815-1890) & O. Hallauer.** Thermodynamique appliquée. Réfutations d'une critique de G. Zeuner. 91 pp. 1. 8vo.  
*Paris, 1881*  
 Controverted points in the thermodynamics of the steam-engine.

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2234. **Hope, Ascott R(obert) i. e. (Ascott Robert Hope Moncrieff).** Wonders of electricity. 128 pp. ill. 1 plate. 12mo. Adapted to the wants of the general reader. *London, (1881)*

2235. **Hospitaler, É(douard).** (1852-1907.) La physique moderne, les principales applications de l'électricité. iii+343 pp. ill. 4 plates. L. 8vo. (Bibliothèque de la Nature.) *Paris, 1881* Popular exposition of the principles of electro-motors, dynamos, electric lighting, telephony, etc.

2235a.—(English translation.) The modern applications of electricity. Translated and enlarged by Julius Maier. viii+463 pp. ill. pl. 8vo. *London, 1882*

2235b.—Second edition, revised with many additions. 2 vols. ill. pl. 8vo. *London, 1883*  
—See also 2327, 2382.

2236. **Jamieson, A(ndrew).** Laying and repairing submarine telegraph cables. 45 pp. 1 map. ill. 8vo. *Glasgow, 1881*  
Popular lecture on submarine cables with map and illustrations.  
—See also 2370, 2384, 4133.

2237. **Jenkin, (Henry Charles) Fleeming.** (1833-1885.) Electricity. 128 pp. ill. 16mo. (Manuals of Elementary Science.) *London, 1881*  
The fundamental principles written by a master of the subject.  
—See also 1677.

2238. **Joubert, J(ules François).** Études sur les machines magnéto-électriques. 46 pp. 4to. *Paris, 1881*  
General theory; measurement of coefficient of self-induction; the electro-dynamometer; alternating currents. Established the fundamental principles of the alternating current generator.  
—See also 2288.

2239. **Kohlfuerst, L(udwig).** Die elektrischen Wasserstands-Anzeiger. 71 pp. ill. 8vo. *Berlin, 1881*  
Electric water-level gauge.  
—See also 3951.

2240. **Korteweg, D(iederich) J(ohannes).** Ueber das ponderomotorische Elementargesetz. (Journ. Mathem., Vol. 90, pp. 49-70.) 4to. *Berlin, 1881*  
Mathematical paper on the force between two elements of current.  
—See also 4088.

2241. **Lartigue, Henry.** (1830-1884.) Les signaux électriques employés sur les chemins de fer. 36 pp. 12mo. *Paris, 1881*  
Summary of a lecture on electric signals for railway purposes.

2242. **Lintern, William.** Magnetic surveying and angular surveying; with records of the peculiarities of needle disturbances, compiled from the results of carefully made experiments. vi+60 pp. 12mo. (Weale's Rudimentary Series, No. 220.) *London, 1881*

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2243. **Maxwell**, James Clerk. (1831-1879.) Elementary treatise on electricity, edited by William Garnett. xvi+208 pp. ill. pl. 8vo. (Clarendon Press Series.) *Oxford, 1881*  
 Suggestive treatise written for the non-mathematical student.  
 —See also 1872.

2244. **Miller**, William Allen. (1817-1870.) Magnetism and electricity, corrected from the fourth London edition. 213 pp. ill. 8vo. *New York, 1881*  
 A College text-book.  
 —See also 1328.

2245. **Montigny**, Ch(arles Marié Valentin). (1819-1890.) Notice sur les effets de la foudre sur les arbres placés près d'un fil télégraphique. 20 pp. 8vo. *Brussels, 1881*  
 A telegraph line a source of danger during thunder storms; effect of line on trees.  
 —See also 3197.

2246. **Nicoll**, Henry J(ames). Great movements and those who achieved them. iv+456 pp. portr. 8vo. *London, 1881*  
 The inventor and improvers of the steam-engine; also the early workers in the field of electric telegraphy.

2247. **Pellat**, (Joseph Solange) H(enri). Différence de potential des couches électriques qui recouvrent deux métaux au contact. 133 pp. 4to. (Thèse.) *Paris, 1881*  
 Doctor's thesis on contact electricity. The author's experiments go to show that the difference of potential between the electric charges on two metallic plates is the same as the potential difference between the plates themselves.

2248. **Piaud**, M. L. Notice sur le compas Thomson d'après une conférence fait par l'inventeur à la Royal United Service Institution. 13 pp. ill. 8vo. *Paris, 1881*  
 The Kelvin navigating compass and mode of compensation.

2249. **Preece**, (Sir) William Henry. Sur la mesure pratique des grandeurs électriques. 23 pp. L. 8vo. *Paris, 1881*  
 Practical measurement of electric quantities.  
 —See also 1496.

2250. **Radau**, (Jean Charles) R(udolph). Le magnétisme. Second edition. 328 pp. ill. pl. 12mo. (Bibliothèque des Merveilles.) *Paris, 1881*  
 Terrestrial magnetism treated at length.

2251. **Rossetti**, Francesco. (1833-1895.) Sullo stato presente delle telegrafia e della telefonia: brevi cenni. 35 pp. 8vo. *Padova, 1881*  
 Progress and actual state (1881) of telegraphy and telephony.  
 —See also 2099.

2252. **Rossetti**, F(rancesco) (1833-1895) & G(iovanni) **Cantoni** (1818-1897.) Bibliografia Italiana di elettricità e magnetismo: saggio compilato per incarico del Ministero d'Agricoltura, Industria e Commercio in occasione della mostra internazionale

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di elettricita che si apre a Parigi nell' Agosto 1881. 117 pp.  
L. 8vo. *Padova, 1881*  
Catalogue of Italian electricians with editions of their publications.  
—See also 2099.

2253. **Rothen**, T. Les mesures électriques. 67 pp. 8vo. *Bern, 1881*  
The fundamental units and practical standards.

2254. **Rowell**, G(eorge) A(ugustus). Electric meteorology: an endeavour to show the general agency of electricity in the cause of rain and its allied phenomena. With an appeal for the consideration of the theory advanced. 44 pp. 8vo.  
*Oxford, 1881*  
Excessive rain in mountainous districts; effects of forests on rainfall.  
—See also 1465.

2255. **Salvatori**, F(edele). Instruzioni sull' uso del Ponte di Wheatstone. 70 pp. ill. 8vo. *Rome & Florence, 1881*  
Practical instructions on the Wheatstone's bridge.  
—See also 4648.

2256. **Sawyer**, William Edward. (?-1883.) Electric lighting by incandescence, and its applications to interior illumination: practical treatise. 189 pp. ill. 8vo. *New York, 1881*  
A general handbook.

2257. **Schneebeli**, Heinr(ich). (1849-1890.) Ueber Condensatoren im Allgemeinen und specielle Beschreibung des Normalcondensators des eidgenoessischen Polytechnikums. (Vierteljahrsschr. Zuericher Naturf.-Ges., Vol. 26, pp. 160-185.) 8vo.  
*Zurich, 1881*  
The use of condensers, theory and practice.  
—See also 4101.

2258. **Siemens**, (Sir) Charles William. (1822-1883.) On some applications of electric energy to horticulture and agriculture. 16 pp. ill. 8vo. *London, 1881*  
Results of exposing plants to the influence of the electric light.

2259.—Le gaz et l'électricité comme agents de chauffage, traduit avec l'autorisation de l'auteur par Gustave Richard. 36 pp. ill. 12mo. *Paris, 1881*  
The original title of Dr. Siemens' paper read "On gas and electricity as heating agents."  
—See also 1654.

2260. **Siemens**, (Ernst) Werner. (1816-1892.) Gesammelte Abhandlungen und Vortraege. viii+582 pp. ill. portr. 6 plates. 8vo. *Berlin, 1881*  
Several important electrical papers written by the author.  
—See also 1214.

2261. **Smith**, Willoughby. (1828-1891.) Résumé of the earlier days of electric telegraphy. 56 pp. 8vo. *(London, 1881)*  
Pamphlet on matters connected with submarine cables.  
—See also 2006.

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2262. **Thompson, Silvanus P(hillips).** Elementary lessons in electricity and magnetism. xiv+446 pp. ill. map. 12mo. *London, 1881*  
This is the first edition of an excellent elementary text-book. (See No. 2371.)  
—See also 2338, 2376, 3847.

2263. **Tommasi, Donato.** De l'équilibre thermique dans les actions chimiques. 12mo. 8vo. *Saint-Denis, 1881*  
Physico-chemical paper.  
—See also 2301, 2342.

2264. **Alglave, Ém(ile) & J. Boulard.** La lumière électrique, son histoire, sa production et son emploi dans l'éclairage public ou privé, les phares, l'industrie etc. xix+464 pp. ill. 24 plates. L. 8vo. *Paris, 1882*  
General description with illustrations of dynamos, lamps, regulators, etc.  
—See also 5451.

2265. **Anderson, Richard.** The lightning rod. On the necessity for a regular inspection of lightning conductors. 45 pp. ill. 8vo. *London, 1882*  
History and practice of the lightning-rod.  
—See also 2126.

2266. **Banneux, J(oseph).** Le téléphone à grande distance. 8 pp. Folio. *Brussels, 1882*  
Account of telephonic research by van Rysselberghe.  
—See also 2017.

2267. **Bartholow, Roberts.** (1831-1904.) Medical electricity, a practical treatise on the applications of electricity to medicine and surgery. Second edition. 291 pp. ill. 8vo. *Philadelphia, 1882*  
Written for use of the medical practitioner.

2268. **Bell, Alexander Graham.** Upon the electrical experiments to determine the location of the bullet in the body of the late President Garfield; and upon a successful form of induction balance for the painless detection of metallic masses in the human body. With an appendix. 58 pp. ill. 8vo. *Washington, 1882*  
The induction balance devised by the author.  
—See also 2225.

2269. **Bjerknes, (Carl Anton).** ( ? -1903.) Phénomènes hydrodynamiques inversement analogues à ceux de l'électricité et du magnétisme. 30 pp. ill. 8vo. *Paris, 1882*  
Hydrodynamical experiments closely imitating certain phenomena of electricity and magnetism.

2270. **Bonel, A.** L'électricité à l'exposition de Bordeaux, 1882. 59 pp. ill. L. 8vo. *Bordeaux, 1882*  
General account of telegraph and electric-light apparatus.  
—See also 1382.

2271. **Campbell, Lewis & William Garnett.** Life of James Clerk Maxwell (1831-1879), with a selection from his correspondence and occasional writings and sketch of his contributions to science. xvi+662 pp. ill. 1 plate. 3 portr. 8vo. *London, 1882*

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2272. **Clark**, (Josiah) Latimer. (1822-1898.) Treatise on the transit instrument as applied to the determination of time. 72 pp. 1 plate. 8vo. *London, 1882*  
Work written to enable the amateur to obtain true time whereby to regulate clocks and watches.  
—See also 1509.

2273. **Collet**, A(lfred Joseph). Traité théorique et pratique de la régulation et de la compensation des compas avec ou sans relevements, compas compensé de Sir William Thomson et appareils auxiliaires, compas compensé et compas correcteur de M. J. Peichl. xl+295 pp. ill. L. 8vo. *Paris, 1882*  
Mathematical theory with practical conclusions regarding the compensation of ships' compasses.

2273a.—(English translation.) Practical guide for compensation without bearings. Translated by W. Bottomley, with preface by Sir William Thomson. xv+56 pp. 2 maps. 8vo. *Portsmouth, 1885*

2274. **Day**, R(ichard) E(van). Electric light arithmetic. vi+80 pp. 16mo. *London, 1882*  
Problems for elementary classes.  
—See also 1972.

2275. **Delarge**, F(rédéric Henri). Notes sur l'électricité dynamique. 88 pp. 1 plate. 8vo. *Brussels, 1882*  
Definitions of electrical quantities and measurements of some of them.  
—See also 1717.

2276. **Dredge**, James, (1840-1906.) Electric illumination, by Conrad W. Cooke, James Dredge, M. F. O'Reilly, S. P. Thompson and H. Vivarez, with abstracts of specifications having reference to electric lightning, prepared by W. L. Wise. 2 vols. ill. Folio. *London, (1882-1885)*  
Comprehensive illustrated work including electric measurements, descriptions of dynamos and lamps; also abstracts of patents. One of the contributors, Dr. M. F. O'Reilly is also known as Brother Potamian. (See No. 1015.)

2277. **Du Moncel**, Th(éodore Achille Louis). (1821-1884.) Le microphone, le radiophone et le phonographe. 304 pp. ill. pl. 12mo. (Bibliothèque des Merveilles.) *Paris, 1882*  
—See also 1223.

2278. **Du Moncel**, Th(éodore Achille Louis) (1821-1884) & (Sir) W(illiam) H(enry) Preece. Incandescent electric lights, with particular reference to the Edison lamps at the Paris exhibition; to which is added the economy of the electric light by incandescence by J. W. Howell; and on the steadiness of the electric current by C. W. Siemens. 176 pp. ill. pl. 16mo. (Van Nostrand Science Series, No. 57.) *New York, 1882*  
Paper on the dynamo-electric current by Dr. C. W. Siemens; also one by Prof. Howell of the Stevens Institute on "Economy of electric lighting."  
—See also 1223, 1496.

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2279. **Duter, É(mile).** Cours d'électricité. (Classe de Rhétorique.) 265 pp. ill. 12mo. An elementary text-book. *Paris, 1882*

2280. **Ermacora, G. B.** Sopra un modo d'interpretare i fenomeni eletrostatici, saggio sulla teoria del potenziale. xxxviii+468 pp. 8vo. *Padova, 1882*  
Phenomena of static electricity mathematically treated.

2281. **Ferrini, R(inaldo Eugenio Domenico Tranquillo) & P. Pogliaghi.** La luminosità elettrica dei gas e la materia radiante. xv+315 pp. ill. pl. 8vo. Electric discharge in air and in rarefied media. *Milan, 1882*  
—See also 2140.

2283. **Gore, G(eorge).** Scientific basis of national progress including that of morality. 218 pp. 12mo. *London, 1882*  
Plea for nature study and scientific research.  
—See also 1357.

2284. **Holmes, A(rthur) B(romley).** The electric light, popularly explained. Third edition. 110 pp. ill. 1 plate. 12mo. *London, 1882*  
—See also 2326.

2285. **Lockwood, T(homas) D.** Practical information for telephonists. 192 pp. 12mo. *New York, 1882*  
Information for telephone operators and inspectors.  
—See also 835c, 2329, 4317.

2286. **Lusson, F.** Les origines de l'électricité. 16 pp. 8vo. *La Rochelle, 1882*  
The salient points in electrical discovery.

2287. **Malapert, E.** Dimensions des unités électriques en fonction des unités fondamentales. (Centimètre-gramme-seconde.) 68 pp. L. 8vo. *Paris, 1882*  
Besides the fundamental and derived units, the pamphlet discusses many points in electric and electro-magnetic theory.

2288. **Mascart, É(leuthère) É(lie) N(icolas) & J(ules François) Joubert.** Leçons sur l'électricité et le magnétisme. 2 vols. ill. 8vo. *Paris, 1882-1886*  
Standard treatise; based upon lectures delivered by Prof. Mascart at the College de France.

2288a.——(English translation.) A treatise on electricity and magnetism. Translated by E. Atkinson. 2 vols. 8vo. *London, 1883-1888*  
—See also 1987, 2238.

2289. **Merling, A.** Die elektrische Beleuchtung in systematischer Behandlung; Construktion und Betriebsverhaeltnisse der Lichtmaschinen, elektrischen Lampen und Kerzen. xii+504 pp. ill. 8vo. (Elektrotechnische Bibliothek, Vol. I.) *Brunswick, 1882*  
General treatment of generators and of arc and incandescent lighting.  
—See also 2158.

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2290. **Meyer, H(enry) R(obert).** The development of electricity and the solution of the problem of the wires. 15 pp. 2 plates. 8vo. *Liverpool, 1882*  
Proposal of a permanent conduit for electrical conductors.

2291. **Moerman, Théophile.** Notice sur l'électro-métallurgie ou extraction économique et rapide des métaux précieux de leurs minerais basé sur l'emploi de l'électricité pour tout faire. 43 pp. 8vo. *Paris, 1882*  
Historical notes.

2292. **Morton, Henry (1836-1902) & W. A. Anderson.** Electric lighting, and the underwriters' standard requirements in reference thereto, with instructions for the proper inspection of electric light equipments. 65+iv pp. ill. 8vo. *1882*  
The electric circuit with practical instructions on electric lighting.  
—See also 2205.

2293. **Newall, R(obert) S.** Facts and observations relating to the invention of the submarine cable and to the manufacture and laying of the first cable between Dover and Calais in 1851. 8 pp. 8vo. *London, 1882*  
The author claims to have been the first to suggest a submarine cable, p. 1.  
—See also 3198.

2294. **Parnell, Arthur.** Action of lightning and the means of defending life and property from its effects. xiii+303 pp. 12mo. *London, 1882*  
General electrical data, also numerous instances of the effects of lightning.  
—See also 4278.

2295. **Parville, (François) Henri (Peudefer) de.** L'électricité et ses applications, Exposition de Paris. 536 pp. ill. pl. 12mo. *Paris, 1882*  
Written for the general reader.

2296. **Picou, R(omuald) V(ictor).** Manuel d'électrométrie industrielle. 155 pp. 8vo. *Paris, 1882*  
Short, practical handbook of electrical measurement.

2297. **Siemens, Friedrich. (1826-1904.)** Bericht ueber die Smoke Abatement Exhibition, London, Winter 1881-1882. 136 pp. ill. L. 8vo. *Berlin, 1882*

2298. **Smith, Willoughby. (1828-1891.)** Induction. 17 pp. 4 plates. 8vo. *London, 1882*  
Short paper on current induction.  
—See also 2006.

2299. **Thomson, (Sir) William (Lord Kelvin). (1824-1907.)** Mathematical and physical papers. Vol. I. 8vo. *Cambridge, 1882*  
Papers on the dynamical theory of heat and on electrolysis.  
—See also 1085.

2300. **Tiemann, Conrad.** Der elektrische Telegraph. Ein Buch fuer Jedermann. Leicht verstaendliche Abhandlungen ueber das gesammte technische Telegraphenwesen, Beschreibung des Baues und der Unterhaltung der Telegraphenlinien, nebst

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einer Zusammenstellung aller auf die Telegraph-Correspondenz bezüglichen Bestimmungen der Telegraphen-Ordnung etc., einem Gebührentarif und einer mit Beispielen erläuternden Anleitung zur Auffassung und Behandlung der Telegramme. x+264 pp. ill. 8vo. Berlin, 1882

Work on the electric telegraph for the general reader.

2301. **Tommasi, Donato.** Histoire des sciences sur la découverte de l'électro-magnétisme. (Cosmos-les-Mondes, Ser. IV, Vol. 5, pp. 326-328.) 8vo. Paris, 1882  
Romagnosi's discovery in 1802 of the deflection of a magnetic needle by the electrostatic effect of an electrode of a voltaic pile, p. 327. (See No. 974.)  
—See also 2263.

2302. **Urquhart, J(ohn) W.** Electro-motors: a treatise on the means and apparatus employed in the transmission of electrical energy, and its conversion into motive power, for the use of engineers and others. xii+178 pp. ill. pl. 8vo. Manchester, 1882  
Useful for the general reader though written for the electrical engineer.  
—See also 2216.

2303. **Webber, C(harles) E(dmund).** Telephonic communication. 18 pp. 4to. London, 1882  
The principle of the carbon transmitter, p. 4.  
—See also 3748.

2304. **Weber, Heinrich.** Der Rotationsinductor, seine Theorie und seine Anwendung zur Bestimmung des Ohm in absoluten Maassen. 76 pp. 2 plates. ill. L. 8vo. Leipzig, 1882  
The spinning coil and the determination of the ohm in absolute measure.  
—See also 1588.

2305. **Wiedemann, Gustav (Heinrich).** (1826-1899.) Die Lehre von der Elektricität, zugleich als dritte volleig umgearbeitete Auflage der Lehre vom Galvanismus und Elektromagnetismus. 4 vols. in 5. ill. 8vo. Brunswick, 1882-1885  
Comprehensive treatise on electricity.  
—See also 1537.

2306. **Wormell, Richard.** Magnetism and electricity, an elementary text-book for students. viii+260 pp. ill. 12mo. (High School Science Series.) London, (1882)  
Directions for laboratory work; construction of elementary apparatus.

2307. **A few practical remarks on the formation and use of de N. de Kabath's patent electric accumulators.** Second edition. ill. 8vo. London, 1882  
Paper of general information concerning storage batteries.

2308. **Abel, (Sir) F(rederic) A(ugustus).** (1827-1902.) Electricity applied to explosive purposes. (Lectures at Institut. Civil Engin. Vol. I. pp. 107-148.) 8vo. London, 1883  
Historical review of the subject; high and low tension fuses; electric mines; use of the induction coil; details of the Hell Gate (New York) explosion,

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Sept. 24, 1876. First application of the electric spark to the ignition of gunpowder wrongly attributed to Franklin, see Dr. Watson's Experiments and Observations, 1746. (See No. 333.)

—See also 1564, 2378, 3594.

2309. **Abernethy**, J. P. Modern service of commercial and railway telegraphy, in theory and practice arranged in questions and answers. Second edition. 318 pp. ill. 12mo. *Cleveland*, 1883

2310. **Ballantyne**, R(obert) M(ichael). (1825-1894.) The battery and the boiler; or, Adventures in the laying of submarine electric cables. vi+420 pp. 6 plates. 12mo. *London*, 1883  
A humorous production.

2311. **Chaney**, H(enry) J(ames). (1842-1906.) Calculations of densities and expansions. 31 pp. L. 8vo. *London*, 1883  
Weight of air, density of water at different temperatures, coefficients of expansion of solids.

2312. **Deprez**, Marcel. Expériences sur le transport et la distribution de la force par l'électricité. 32 pp. 4to. *Grenoble*, 1883  
Details of the method employed in the transmission of electric energy and discussion of results obtained.  
—See also 5454.

2313. **Du Moncel**, Th(éodore) Achille Louis) (1821-1884) & Frank Geraldry. L'électricité comme force motrice. 304 pp. ill. pl. 12mo. (Bibliothèque des Merveilles.) *Paris*, 1883  
Historical electro-motors: that of Elias and the dynamo of Pacinotti.

2313a.—(English translation.) Electricity as a motive power. Translated with additions by J. Wharton. vii+316 pp. 8vo. *London*, 1883  
—See also 1223.

2314. **Fahie**, J. Angelo. On magneto and dynamo-electric machines. 37 pp. ill. 8vo. *Dublin*, 1883  
Short account of various machines.

2315. **Fahie**, J(ohn) J(oseph). Honour to whom honour is due. Edward Davy and the electric telegraph. 1836-1839. (Extract, Electrician, Vol. 11.) 48 pp. ill. 8vo. *London*, 1883  
The author's needle instrument and electro-chemical telegraph, patented in 1837-1838.  
—See also 2354, 4220.

2316. **Fiske**, Bradley A. Electricity in theory and practice or the elements of electrical engineering. 270 pp. ill. pl. 8vo. *New York*, 1883  
Work written for the general reader.

2317. **Fitzgerald**, Geo(rge) Francis. (1851-1901.) On the possibility of originating wave disturbances in the ether by means of electric forces. (Trans. Roy. Soc. Dublin, Vol. 1, pp. 133-134+173-176.) 4to. *Dublin*, 1883  
Two short papers of a mathematical nature.  
—See also 4078.

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2318. **Forcieri, Pietro.** La telegrafia elettro-tecnica, guida per la conoscenza a maneggio degli apparati telegrafici, principalmente di quelli a sistema Morse, Hughes, Wheatstone, Duplex e Meyer. vii+264 pp. ill. 8vo. *Turin, 1883*  
Work intended for the telegraph operator.

2319. **Gladstone, J(ohn) H(all) (1827-1902) & Alfred Tribe (1840-1885).** The chemistry of the secondary batteries of Planté and Faure. xi+59 pp. 12mo. (Nature Series.) *London, 1883*  
Research on the theory and action of accumulators.  
—See also 1832.

2320. **Glaser-de Cew, Gustav.** Die magnetelektrischen und dynamo-elektrischen Maschinen und die sogenannten Secundaer-Batterien, mit besonderer Ruecksicht auf ihre Construction. xvi+263 pp. ill. 12mo. (Elektrotechnische Bibliothek, Vol. I.) *Vienna, 1883*  
Early forms of dynamos briefly described; theory of the dynamo; storage batteries.

2320a.— —(English translation.) Magneto and dynamo electric machines with accumulators. Translated by F. Krohn and specially edited with many additions by Paget Higgs. xiii+301 pp. ill. 8vo. (The Specialist's Series.) *London, 1884*

2321. **Greer, Henry.** Dictionary of electricity; or, The electrician's handbook of reference; including recent electrical and technical terms, and descriptions of the late inventions of the Paris Electrical Exhibition, and of other new inventions in electricity and magnetism; with additions by W. L. Allison. 192 pp. ill. 12mo. *New York, 1883*  
Short articles on electrical terms.

2322.— —The storage of electricity. 42 pp. 8vo. *New York, 1883*  
Contains a paper by Prof. S. P. Thompson; various storage batteries; chemistry of the storage battery.

2323. **Grierson, Thomas B.** Electric lighting by water-power. 44 pp. 8vo. *Dublin, 1883*  
The use of waterfalls and wind-power in Ireland.

2324. **Hankel, W(ilhelm) G(ottlieb). (1814-1899.)** Elektrische Untersuchungen. XV. Abhandlung: Ueber die Aktino- und Piezoe-elektrischen Eigenschaften des Bergkristalles und ihre Beziehung zu den Thermoelektrischen. (Abh. Saechs. Ges. Wiss. Math.-Nat. Kl., Vol. 12, pp. 459-547.) 4 plates. L. 8vo. *Leipzig, 1883*  
Researches in thermo and in piezo-electricity with colored drawings of electrified crystals.  
—See also 1524.

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2325. **Hedges**, Killingworth. The supply of electricity by local authorities. 31 pp. ill. 8vo. *London, 1883*  
Distribution mains; generators; storage batteries, etc.  
—See also 2149.

2326. **Holmes**, A(rthur) Bromley. Practical electric lighting. 154 pp. ill. 1 plate. 12mo. *London, 1883*  
Simple explanation of the principles involved in the production and regulation of the light.  
—See also 2284.

2327. **Hospitalier**, Édouard. (1852-1907.) Formulaire pratique de l'électricien. Years I. & II. 1883, 1884. ill. 12mo. *Paris, 1883-1884*  
Handbook of instructions in electrical engineering.

2327a.—(English translation.) The electrician's pocket-book. The English edition of "Formules pratiques de l'électricien." Translated with additions by Gordon Wigan. xv+318 pp. ill. 12mo. *London, 1884*  
—See also 2235.

2328. **Jacques**, Ernest. Dictionnaire d'électricité et de magnétisme, étymologique, historique, théorique, technique avec la synonymie française, allemande et anglaise. viii+281 pp. 8vo. *Paris, 1883*  
The terms are given in French, German and English; the descriptive part is in French only.

2329. **Lockwood**, Thomas (D.). Electrical measurement and the galvanometer, its construction and uses. iii+137 pp. ill. 12mo. *New York, 1883*  
Electrical measurements involving the use of the galvanometer.

2330.—Electricity, magnetism and electric telegraphy, a practical guide and handbook. 377 pp. ill. 8vo. *New York, 1883*  
Elementary treatment of the principles and practice of telegraphy and telephony.  
—See also 2285.

2331. **Munro**, J(ohn). Electricity and its uses. xii+180 pp. ill. pl. 12mo. *London, (1883)*  
Advances made in the applications of the electric current written for the wants of the general reader.  
—See also 2370, 3696.

2332. **Rayleigh**, (Lord) (John William Strutt). Reprint of some physical papers.—An experiment to illustrate the induction on itself of an electric current. (Extract, *Nature*, Vol. 6, 1872.) 3 pp.—Vibrations of a liquid in a cylindrical vessel. (Extract, *Nature*, Vol. 12, 1875.) 3 pp.—Absolute pitch. (Extract, *Nature*, Vol. 17, 1877.) 5 pp.—On the determination of absolute pitch by the common harmonium. (Extract, *Nature*, Vol. 19, 1879.) 4 pp.—The photophone. (Extract, *Nature*,

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Vol. 23, 1881.) 3 pp.—The soaring of birds. (Extract, *Nature*, Vol. 28, 1883.) 3 pp.—Distribution of energy in the spectrum. (Extract, *Nature*, Vol. 28, 1883.) 2 pp.—On the tension of mercury vapour at common temperature. (Extract, Report, British Ass. Adv. Sc., 1882.) 1 p.—On the absolute measurement of electric currents. (Extract, Report, British Ass. Adv. Sc., 1882.) 2 pp.—On the duration of free electric currents in an infinite conducting cylinder. (Extract, Report, British Ass. Adv. Sc., 1882.) 2 pp.—8vo. *London, 1883*  
—See also 3793.

2333. **Schontjes**, H. *Les grandeurs électriques et leurs unités*. Second edition. 120 pp. ill. L. 8vo. *Gand, 1883*  
Electrical units: theory.

2334. **Smith**, Willoughby. (1828–1891.) *Volta-electric induction*. 6 pp. Folio. (Proof-sheets.) *London, 1883*  
Paper of general physical interest.  
—See also 2006.

2335. **Steenackers**, F(rançois) F(rédéric). *Les télégraphes et les postes pendant la guerre de 1870–1871. Fragments de mémoires historiques*. 620 pp. 12mo. *Paris, 1883*  
Part played by the pigeon-post, by balloons and the electric telegraph during the Franco-Prussian War.

2336. **Swift**, James A. *The practical telegrapher, a manual of practical telegraphy and telegraphic construction*. 187 pp. ill. 8vo. *New York, 1883*

2337. **Swinburne**, James. *Practical electrical units popularly explained*. 61 pp. 12mo. *London, 1883*

2338. **Thompson**, Silvanus P(hillips). *Cantor lectures on dynamo-electric machinery*. 54 pp. ill. L. 8vo. (Soc. Encour. Arts, Manuf. & Commerce.) *London, 1883*  
These lectures were developed in the author's standard work on *Dynamo-Electric Machinery*. (See No. 2376.)

2339.——Philipp Reis, inventor of the telephone, a biographical sketch, with documentary testimony, translations of the original papers of the inventor and contemporary publications. ix+182 pp. ill. 2 plates. 8vo. *London, 1883*  
Biography of Philipp Reis, his claim to be considered the inventor of the telephone maintained; together with much important telephonic matter.

2340.——The first telephone. (Extract, Proc. Bristol Natur. Soc.) 9 pp. ill. 8vo. *London, 1883*  
The work of Philipp Reis.  
—See also 2262.

2341. **Thomson**, (Sir) William (Lord Kelvin). (1824–1907.) *Electrical units of measurement*. 6 pp. 8vo. *London, 1883*  
Abstract of a lecture delivered at the Institution of Civil Engineers, May 2, 1883. Work of Cavendish and Coulomb; much of our present nomenclature.

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ture due to Sir Charles Bright and Latimer Clark; recovery of the centimeter.  
—See also 1085.

2342. **Tommasi, Donato.** Recueil de quelques mémoires publiés pendant 1882 dans le *Cosmos-les-Mondes*. 18 pp. 8vo. *Saint-Denis, 1883*

Five short papers on electrical subjects.  
—See also 2263.

2343. **Wetter, Rodolphe van.** La télégraphie optique. 65 pp. 1 plate. 8vo. *Antwerp, 1883*

The heliograph and electric light.

2344. **Wahl, William H(enry).** Galvanosplastic manipulations, a practical guide for the gold and silver electroplater and the galvanosplastic operator. 656 pp. ill. 8vo. *Philadelphia, 1883*

2345. **Die elektrische Revolution.** Populaer-wissenschaftlich dargestellt von einem Fachmann. 74 pp. 12mo. *Munich, 1883*

Short popular exposition of the applications of the electric current with bibliography.

2346. **Bignani, E(nrico).** L'elettricità e le sue applicazioni. 219 pp. ill. 12mo. *Milan, 1884*

General account of dynamos, motors, telephones.

2347. **Boggett, William.** Thoughts on the inter-dependence of water and electricity and cognate subjects. 21 pp. 8vo. Electricity in combination with oxygen and hydrogen are the three constituents of water. *London, 1884*

2347a.—(Another edition.) 32 pp. 8vo. *London, 1884*

—See also 2227.

2348. **Bolton, (Sir) Francis.** (1831-1887.) London water supply. viii+245 pp. charts. 8vo. *London, 1884*

History and description of the London waterworks with maps, statistical tables, etc.

2349. **Bottone, S(elimo) R(omeo).** The dynamo, how made and how used. 73 pp. ill. 12mo. *London, 1884*

Instructions for making a hand-dynamo.

2349a.—Fourth edition. 73 pp. ill. 12mo. *London, 1887*

—See also 2431.

2350. **Bramwell, (Sir) Frederick.** (1818-1893.) Telephones. 32 pp. ill. 8vo. *London, 1884*

A lecture on the telephone including the phonograph and photophone.  
—See also 2378, 4216.

2351. **Clausius, Rudolph Julius Emmanuel.** (1822-1888.) On the theory of the dynamo-electric machine. Translated by Paget Higgs. (Extract, Minutes Proc. Instit. Civil Engin. Vol. 75.) 16 pp. 8vo. *London, 1884*

Some fundamental dynamo equations; discussion and application.  
—See also 1669.

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2352. **Coulomb**, (Charles Augustin). (1736-1806.) Mémoires relatifs à la physique. Vol. I. Poitier rédacteur. Collection de la Société Française de Physique. 6+414 pp. 8vo.  
*Paris, 1884*  
 Seven memoirs relating to electricity and magnetism. Coulomb's torsion balance, pp. 108-115; electric pendulum, pp. 116-146; Biot anticipated, p. 233.  
 —See also 490.

2353. **Daniell**, Alfred. Textbook of the principles of physics. xx+653 pp. ill. 8vo.  
*London, 1884*  
 Comprehensive manual of general physics.

2354. **Fahie**, J(ohn) J(oseph). History of electric telegraphy to the year 1837, chiefly compiled from original sources and hitherto unpublished documents. xix+542 pp. ill. pl. 12mo.  
*London, 1884*  
 Succinct history of static and dynamic electricity, electro-magnetism and magneto-electricity, with *bibliography of sympathetic telegraphy*. (See No. 4220.)  
 —See also 2315.

2355. **Gordon**, J(ames) E(dward) H(enry). (1852-1893.) Practical treatise on electric lighting. xv+228 pp. ill. pl. 8vo.  
*London, 1884*  
 Besides technical, there is much general matter relating to the development and application of electric energy.  
 —See also 2145.

2356. **Gore**, G(eorge). An improved thermo-electric pile for measuring small electromotive forces. (Proc. Birmingham Philos. Soc., Vol. 4, pp. 129-132.) 8vo.  
*Birmingham, 1884*  
 Description of the apparatus with remarks on its usefulness.

2357.——The utility and morality of vivisection. 32 pp. 8vo.  
*London, 1884*  
 Plea for physiological experiments on animals.  
 —See also 1357.

2358. **Gray**, Andrew. Absolute measurements in electricity and magnetism. xiv+207 pp. ill. 12mo.  
*London, 1884*  
 Laboratory manual: theory and practice.

2358a.——Second edition, revised and greatly enlarged. xix+384 pp. ill. 12mo.  
*London, 1889*

2359. **Hammond**, Robert. The electric light in our homes. xii+188 pp. ill. pl. 12mo.  
*London, (1884)*  
 Popularly written work on general electric illumination.

2360. **Heap**, D(avid) P(orter). Electrical appliances of the present day; being a report on the Paris Electrical Exhibition of 1881. 287 pp. ill. pl. 8vo.  
*New York, 1884*  
 Description of batteries, dynamos, arc and incandescent lamps, lighthouses, military telegraphs, torpedo apparatus.

2361. **Hillairet**, A. Transmission électrique du travail mécanique. Détermination des éléments de la transmission. 78 pp. L. 8vo.  
*Paris, 1884*  
 Theoretical considerations relating to the electric transmission of power.

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2362. **Hopkinson, John.** (1849-1898.) On the theory of alternating currents, particularly in reference to two alternate current machines connected to the same circuit. 9 pp. Folio. (Proof-sheets.)  
The subject is treated mathematically.  
—See also 2378, 3877. 1884

2363. **Joule, James Prescott.** (1818-1889.) Scientific papers; published by the Physical Society of London. 2 vols. ill. pl. tab. 8vo.  
London, 1884-1887  
This important collection contains papers on the mechanical equivalent of heat; on magnetism, electro-magnetism, magnetic and electro-magnetic forces, and electro-calorimetry; also the various determinations of the "mechanical equivalent" of heat.  
—See also 2918.

2364. **Lock, C(harles) G(eorge) Warnford.** Workshop receipts for the use of manufacturers, mechanics and scientific amateurs. xvi+480 pp. ill. 12mo. (Spon, Ernest. Workshop receipts. Third series.) London, 1884

2365. **Lodge, (Sir) Oliver J(oseph).** On the seat of the electromotive forces in the voltaic cell. 70 pp. ill. 8vo. London, 1884  
Extensive treatment of the subject.  
—See also 2439, 3827.

2366. **Lupton, Sydney.** Numerical tables and constants in elementary science. xv+96 pp. map. tab. 12mo. London, 1884  
Tables of physical and chemical constants.

2367. **Lynd, William.** Practical telegraphist and guide to the telegraph service. 227 pp. ill. 12mo. London, (1884)  
Useful compilation of telegraph matter.

2368. **Mach, T. von.** Technisches Woerterbuch fuer Telegraphie und Post; deutsch-franzoesisch und franzoesisch-deutsch. 395 pp. 8vo. Berlin, 1884  
Dictionary of electro-technical terms in German-French and French-German.

2369. **May, Gustav.** Die Weltliteratur der Elektricitat und des Magnetismus von 1860-1883, mit besonderer Beruecksichtigung der Elektro-Technik. Mit Sachregister von O. Salle. xiii+203 pp. 12mo. (Hartleben Collection, Elektrotechnische Bibliothek, Vol. XX.) Vienna, 1884  
List of works on electricity covering the period 1860-1883 with bibliographical note following some titles.

2369a.—(English edition.) A bibliography of electricity and magnetism, 1860-1883. With special reference to electro-technics. With an index by O. Salle. viii+203 pp. 12mo.  
London, 1884

2370. **Munro, John & Andrew Jamieson.** Pocketbook of electrical rules and tables for the use of electricians and engineers. 480 pp. ill. 32mo. London, 1884  
—See also 2236, 2331.

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2371. **Murdock, J(oseph) B(allard).** Notes on electricity and magnetism, designed as a compendium to S. P. Thompson's elementary lessons. viii+139 pp. ill. 12mo. *New York, 1884*  
Proofs of important formulae. (See No. 2262.)  
—See also 4190.

2372. **Prescott, George B(artlett).** (1831-1894.) Dynamo-electricity; its generation, application, transmission, storage and measurement. xii+867 pp. ill. pl. 8vo. *New York, 1884*  
Electrical engineering in theory and practice.  
—See also 1497.

2374. **Swinton, Alan A. Campbell.** The principles and practice of electric lighting. viii+172 pp. ill. 12mo. *London, 1884*  
Written for the general reading public.

2375. **Ternant, A. L.** Les téléphones. Agencement des bureaux téléphoniques dans les grands centres.—Construction des lignes et exploitation.—Auditions téléphoniques musicales.—Fanfare ader. 64 pp. ill. 8vo. *Marseille, 1884*  
The telephone and telephone-exchanges; claims of Charles Bourseul 1854, and Philipp Reis, 1861. Elisha Gray and Alexander Graham Bell took their patents in 1876.  
—See also 1756.

2376. **Thompson, Silvanus P(hillips).** Dynamo-electric machinery, a manual for students of electrotechnics. xii+408 pp. ill. 8vo. *London, 1884*  
First edition of a standard work for the use of electrotechnical students. (See No. 2338.)

2376a.—Second edition, enlarged. xvii+527 pp. ill. 8vo. *London, 1886*  
—See also 2262.

2377. **Turner, H(enry) F(yers).** Notes on military telegraph instruments with diagrams of connections. vi+25 pp. 33 plates. 12mo. *1884*  
The diagrams form a special feature of the booklet.

2378. **Institution of Civil Engineers.** The practical applications of electricity. A series of lectures delivered at the Institution of Civil Engineers, Session 1882-1883. iv+181 pp. ill. 2 plates. 8vo. *London, 1884*  
The progress of telegraphy by Sir William Henry Preece; Telephones by Sir Frederick Bramwell; the electric transmission and storage of power by Dr. Charles Siemens; some points in electric lighting by Dr. John Hopkinson; electricity applied to explosive purposes by Prof. Frederic Augustus Abel. Electrical units of measurement by Sir William Thomson (Lord Kelvin).  
—See also 1085, 1497, 1654, 2308, 2350, 2362.

2379. **Blakesley, Thomas H(olmes).** Alternating currents of electricity. 90 pp. 8vo. (Reprinted from papers published in the Electrician.) *London, 1885*  
Geometrical methods applied to problems involving the flow of electricity, subject to harmonic variation.  
—See also 5331.

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2380. (Boggett, William.) Facts proving that lightning is a composite force. 12 pp. 8vo. *London, 1885*  
 Electricity is one of the constituents of water, p. 1, and is the true source of life, p. 11.  
 —See also 2227.

2381. Fontaine, Hippolyte. Electrolysis, a practical treatise on nickel-ing, coppering, gilding, silvering the refining of metals and treatment of ores, by means of electricity; translated from the French by J. A. Berly. xii+256 pp. ill. 8vo.  
*London, 1885*  
 Batteries and electric generators used in electro-metallurgy.  
 —See also 2027.

2382. Hospitalier, É(douard). (1852-1907.) Domestic electricity for amateurs, translated from the French, with additions by C. J. Wharton. viii+229 pp. ill. pl. 8vo. *London, 1885*  
 General instructions about electric bells, clocks, telephones; also electro-plating, gilding, etc.  
 —See also 2235.

2383. Houston, E(dwin) J(ames), A. E. Baines & C. H. W. Biggs. Primers of electricity. 29 lectures. Second edition. ill. 8vo.  
*London, 1885*  
 Information of a general, practical character.  
 —See also 2438.

2384. Jamieson, Andrew. Electric lighting for steamships, with an abstract of the discussion upon the paper; edited by James Forrest. 97 pp. ill. pl. 8vo. *London, 1885*  
 Selection of dynamo and methods of driving; arc and glow lamps; discussion by Preece, Swan, Mance, Siemens and others.  
 —See also 2236.

2385. Lane, Denny. On the elementary principles of the gas-engine. 20 pp. 8vo. *(London) 1885*  
 Application of the second law of thermodynamics, efficiency indicator diagrams; the passing of the steam-engine.

2386. Madsen, C(hristian) L(udwig). On forskjellige lednings-systemer i store telefonanlaeg. 21 pp. L. 8vo.  
*Copenhagen, 1885*  
 Short pamphlet on electric telephony.  
 —See also 2037.

2387. Marchese, E(ugenio). Traitement électrolytique des mattes cuivreuses au Stolberg. 64 pp. 8vo. *Genoa, 1885*  
 Electrolytic refinement of copper.  
 —See also 4232.

2388. Maver, William (Jr.), & M. M. Davis. The quadruplex; with chapters on the dynamo-electric machine in relation to the quadruplex, the practical working of the quadruplex, telegraph repeaters, and the Wheatstone automatic telegraph, by Wm. Maver, Jr. 128 pp. ill. L. 8vo. *New York, 1885*  
 Description of the Edison quadruplex-system of telegraphy, written for operators.

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2389. **Rowell**, George A(ugustus). Electric meteorology; on the cause of terrestrial magnetism; on the cause of the change of the declination of the magnetic needle; on electric meteorology as connected with forestry. 17 pp. pl. 8vo. *Oxford, 1885*  
Short paper on earth-currents as a cause of terrestrial magnetism; the earth is a vast hydro-electric machine.

2389a.—Electric meteorology; what is gas? How the theory was worked up. An appendix, 1884. 16 pp. 8vo. *Oxford, 1885*

Height of aurorae, p. 15.  
—See also 1465.

2390. **Smith**, Willoughby. (1828-1891.) Induction and conduction. 21 pp. ill. 8vo. *(London), 1885*  
General considerations on electrostatic induction.

2391.—Magnetism. 45 pp. ill. 8vo. *(London), 1885*  
General facts of magnetism with beautiful representation of magnetic fields. The paper was written in 1885 while the author held the position of electrician to "The Telegraph Construction and Maintenance Company."  
—See also 2006.

2392. **Spon**, Ernest. Workshop receipts for manufacturers, mechanics, and scientific amateurs. iv+450 pp. 12mo. *London, 1885*  
—See also 2213.

2393. **Spyr**, William J(ames) J(oseph). Engineer's, officer's watch, station, quarter, and fire bills, with notes on electricity and electric lighting. 93 pp. 12mo. *Portsmouth, 1885*  
Notes on electric lighting.

2394. **Stephen**, Vincent. Wrinkles in electric lighting. ix+45 pp. ill. 12mo. *London, 1885*  
Simple instructions written for engineers on board ship.

2395. **Turner**, H(erbert) H(all). Collection of examples on heat and electricity. 75 pp. 12mo. *London, 1885*  
The examples are of an advanced mathematical character.

2396. **Urbanitzky**, Alfred von. Les lampes électriques et leurs accessoires, édition française par George Fournier. xvi+216 pp. ill. 16mo. (Bibliothèque des Actualités Industrielles, No. IV.) *Paris, 1885*  
Technics of the principal arc and glow lamps.  
—See also 2417.

2397. **Vivarez**, Henry. Construction des réseaux électriques aériens en fils de bronze silicieux: Lignes télégraphiques, téléphones; transport de force; lumière électrique. Second edition, revised (entièremment refondue). 175 pp. 1 plate. 8vo. *Paris, 1885*  
Use of bronze and alloys for telegraph lines.

2398. **Watson**, H(enry) W(illiam) & S. H. **Burbury**. Mathematical theory of electricity and magnetism. 2 vols. 8vo. *Oxford, 1885-1889*  
Written for advanced mathematical students.

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2399. **Williams, W.** Manual of telegraphy. xxii+327 pp. ill. 8vo. *London, 1885*  
 Book of reference for telegraphic matters.

2400. **Woodward, C(harles) J(osiah).** Arithmetical physics; magnetism and electricity. (Degree and Honour Stages.) 52 pp. ill. 12mo. *London, (1885)*  
 A primer of electricity.  
 —See also 2014.

2401. **Franklin Institute.** Report on the efficiency and duration of incandescent electric lamps. (Franklin Institute, Report.) 127 pp. 1 plate. ill. 8vo. *Philadelphia, 1885*  
 Extensive paper giving methods and numerical results.

2402. **Institution, Civil Engineers.** Lectures on heat in its mechanical applications. (Institution of Civil Engineers, Session 1883-1884.) 236 pp. 4 plates. 8vo. *London, 1885*  
 Thermodynamics by Prof. Osborne Reynolds; gas and caloric engines by Prof. Fleeming Jenkin; heat action of explosives by Captain Andrew Noble.  
 —See also 1677, 4025.

2403. **Baker, W. G.** Magnetism and electricity, a specific subject of instruction in public elementary schools. 144 pp. ill. 12mo. (Blackie's Elementary Text-books.) *London, (1886?)*  
 Primer of electricity and magnetism.

2404. **Boggett, William.** Electricity analyzed. ii+24 pp. 8vo. *London, 1886*  
 Facts showing, according to the author, that water always contains electricity.  
 —See also 2227.

2405. **Cumming, Linnaeus.** Electricity treated experimentally for the use of schools and students. xiii+389 pp. ill. 12mo. *London, 1886*  
 A deservedly popular handbook.  
 —See also 1971.

2406. **Fleming, J(ohn) A(mbrose).** Short lectures to electrical artisans; being a course of experimental lectures delivered to a practical audience. viii+208 pp. ill. 12mo. *London, 1886*  
 Popular work containing much general information; description and use of the author's potentiometer.  
 —See also 2437.

2407. **Gordon, J(ames) E(dward) H(enry).** (1852-1893.) School electricity. xii+262 pp. ill. 12mo. *London, 1886*  
 Account of the experiments of Prof. Bjercknes on fields of force.  
 —See also 2145.

2408. **Gore, G(eorge).** On "Resistance" at the surfaces of electrodes in electrolytic cells. (Proc. Birmingham Philos. Soc., Vol. 5, pp. 1-8.) 8vo. *Birmingham, 1886*  
 Phenomena of "transfer resistance" not due to polarization.

2408a.—Evidence respecting the reality of "transfer resistance" in electrolytic cells. (Proc. Birmingham Philos. Soc., Vol. 5, pp. 26-33.) 8vo. *Birmingham, 1886*  
 An electric resistance differs from that of polarization and conduction.

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2408b.—Relations of surface-resistance at electrodes to various electrical phenomena. (Proc. Birmingham Philos. Soc., Vol. 5, pp. 36-44.) 8vo. *Birmingham, 1886*  
A difference of transfer-resistance cannot produce a current.

2409.—On the Peltier effect at different temperatures. (Proc. Birmingham Philos. Soc., Vol. 5, pp. 53-56.) 8vo. *Birmingham, 1886*  
The results given are in agreement with Tait's thermo-electric diagram.  
—See also 1357.

2410. **Henry, Joseph.** (1797-1878.) Scientific writings. 2 vols. ill. L. 8vo. *Washington, 1886*  
This record of a life-work of research in all branches of physical knowledge is divided into two periods, the first from 1824 to 1846 during the 22 years of the author's professorial career; and the second from 1847 to 1878 during his directorship of the Smithsonian Institution. The papers are arranged chronologically.  
—See also 1002.

2411. **Kapp, Gisbert.** Electric transmission of energy and its transformation, subdivision and distribution. xi+331 pp. ill. pl. 8vo. (The Specialist's Series.) *London, 1886*  
General principles of electrical engineering with special reference to the transmission of energy.  
—See also 4299.

2412. **Luce, Robert.** Electric railways and the electric transmission of power described in plain terms. 106 pp. ill. 1 plate. 12mo. *Boston, 1886*  
Includes notes on electricity on elevated roads; telpherage.

2413. **McGregor, W(illiam).** Loss of life and property by lightning at home and abroad. Plea for inaugurating a new and responsible "Society for the protection of life and property from lightning." 26 pp. 8vo. *Bedford, 1886*  
Scope of the Society for the protection of life and property from lightning with some relevant matter.  
—See also 1945.

2414. **Nipher, Francis E(ugene).** Theory of magnetic measurements, with an appendix on the method of least squares. 94 pp. portr. ill. 12mo. *New York, 1886*  
Prepared specially for use in magnetic-surveys.  
—See also 3834.

2415. **Schilling, N. H.** The present condition of electric lighting. 55 pp. 8vo. *Boston, 1886*  
Special reference to affairs in Munich; some points in the physics of electric light.

2416. **Tarn, H. C.** Magnetism and electricity. viii+184 pp. ill. 12mo. *London, 1886*  
Prepared as a text-book for elementary examinations.

2417. **Urbanitzky, Alfred von.** Electricity in the service of man; a popular and practical treatise on the applications of electricity

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in modern life; from the German. Edited with copious additions by R. Wormell, with an introduction by John Perry. xxx+869 pp. ill. pl. 8vo. *London, 1886*  
 Written for the general as well as the more technical reader.  
 —See also 2396.

2418. **Walker**, Frederick W. Practical dynamo-building for amateurs. 63 pp. ill. 12mo. *London, 1886*  
 Short instructions followed by notes on lamps and on storage batteries.

2419. **Ayrton**, W(illiam) E(dward). Practical electricity, a laboratory and lecture course for first year students of electrical engineering. xvi+516 pp. ill. 12mo. *London, 1887*  
 —See also 1791.

2420. **Crookes**, (Sir) William. Genesis of the elements. 28 pp. 8vo. *London, 1887*  
 Special reference to the author's work on yttria; speculation concerning protyle; atomic nature of electricity.  
 —See also 3389.

2421. **Hering**, Carl. Practical directions for winding magnets for dynamos. 63 pp. ill. 12mo. *London, 1887*  
 The author's method of calculating the windings of field-magnets.

2422. **Jeans**, William T. Lives of the electricians, Professors Tyndall, Wheatstone, and Morse. Series I. xvi+327 pp. 12mo. *London, 1887*  
 Interesting account of the life and work of electrical pioneers.

2423. **Mendenhall**, Thomas C(orwin). A century of electricity. 229 pp. ill. diagrs. 12mo. *Boston, 1887*  
 Sketch of the growth of the science of electricity and its principal applications in the nineteenth century.

2424. **Nicol**, Donald. The telegraph and telephone considered in relation to economy and efficiency. 32 pp. L. 8vo. *London, 1887*  
 The paper advocates the use of bitumen for insulation purposes.

2425. **Planté**, (Raymond Louis) Gaston. (1834-1889.) The storage of electrical energy and researches on the effects created by currents combining quantity with high tension; translated from the French by Paul Bedford Elwell. 268 pp. portr. ill. 12mo. *London, 1887*  
 Researches of the author extending over a period of twenty years.  
 —See also 2162.

2426. **Robinson**, Henry. Hydraulic power and hydraulic machinery. xiv+190 pp. ill. 43 plates. 8vo. *London, 1887*  
 Text-book for hydraulic engineers.

2427. **Smith**, Frederick John. On some new forms of work-measuring machines as applied to dynamos and electro-motors. 32 pp. 1 plate. ill. 12mo. *London, 1887*  
 Note on dynamometers in general; the transmission ergometer.

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2428. **Stewart, Balfour** (1828-1887) & **W(illiam) W(inson) H(aldan) Gee.** Lessons in elementary practical physics. Vol. II. ill. 12mo. *London, 1887*  
Vol. II. Practical measurements in electricity and magnetism.  
—See also 1925.

2429. **Belloc, Alexis.** La télégraphie historique depuis les temps les plus reculés jusqu'à nos jours. xi+343 pp. ill. L. 8vo. *Paris, 1888*  
A considerable part of the book is devoted to the history of the mechanical telegraph. The remainder treats briefly of the electric telegraph and telephone together with their uses for military purposes.

2430. **Boggett, William.** Key to the mysteries of water, electricity and heat. 70 pp. 12mo. *London, 1888*  
The composition of water and its use for the preservation of health.  
—See also 2227.

2431. **Bottone, S(elimo) R(omeo).** Electrical instrument-making for amateurs. A practical handbook. Second edition. 183 pp. ill. 12mo. *London, 1888*  
Serviceable book of instructions.  
—See also 2349.

2432. **Hedges, Killingworth.** Central-station electric lighting with notes on the methods used for the distribution of electricity. vii+128 pp. ill. plate. 12mo. *London, (1888)*  
—See also 2149.

2433. **Pope, Franklin Leonard.** (1840-1895.) American inventors of the telegraph. (Extract, *The Century, New Ser.*, Vol. 13, pp. 924-944.) ill. 8vo. *London, 1888*  
Clear statement of Vail's claims to be considered the *co-inventor* with Morse of electric telegraphy.  
—See also 1753.

2434. **Boggett, William.** Life, what it is sustained by, and cognate subjects. 56 pp. 12mo. *London, 1889*  
The author believes that "without heat there is no electricity and no electricity without heat," p. 35.  
—See also 2227.

2435. **Brown, Harold P.** Comparative danger to life of the alternating and continuous electrical currents. 61 pp. ill. 8vo. *New York, 1889*  
"The nature of the alternating current is such that no possible precautions can afford protection to life except the limitation of the pressure to 300 volts;" electrocution experiments on dogs, calves, etc.

2436.—Electrical distribution of heat, light and power, with partial list of deaths from electrical lighting apparatus, and address by John Murray Mitchell, on legislative control of dangerous electrical currents. 48 pp. 12mo. *New York, 1889*  
The pamphlet contains illustrations showing the water-analogues of the series arrangement of lamps, the multiple-arc, the three-wire system, etc.

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2437. **Fleming, J(ohn) A(mbrose).** The alternate current transformer in theory and practice. Vol. I. ill. 8vo. *London, 1889*  
The history and practice of the alternate-current transformer.  
—See also 2406.

2438. **Houston, Edwin J(ames).** Dictionary of electrical words, terms and phrases. iv+640+15 pp. ill. 12mo. *New York, 1889*  
Book of reference; numerous diagrams and illustrations.  
—See also 2383, 4269.

2439. **Lodge, (Sir) Oliver J(oseph).** Modern views of electricity. xvi+422 pp. ill. 12mo. (Nature Series.) *London, 1889*  
Important contribution to our knowledge of the mechanism of the electric current and the phenomena of the ether.  
—See also 2365.

2440. **Badt, F(rancis) B. & H(enry Smith) Carhart.** Derivation of practical electrical units. With twelve illustrations. 56 pp. port. tabl. 12mo. *Chicago, 1890*  
Biographical sketches of famous electricians; remarks on the electrical units.

2442. **Dearlove, Arthur L.** Tables to find the working speed of cables; comprising also data as to diameter, capacity, and copper resistance of all cores. 20 pp. 32mo. *London, 1890*  
The tables for speed of signaling are based on the mean results obtained in working certain long cables.

2443. **Langdon(-Davies), (Charles).** An explanation of the phonopore and more especially of the simplex phonopore telegraph. Printed in English and French. 68 pp. ill. 4to.  
*London, 1891*  
Results and means by which they were obtained; the features of the system briefly described by Conrad W. Cooke.  
—See also 5501.

2444†. **Pacinotti, Antonio (b. 1841.)** (Autograph letter and memoranda, sketches and photographic portraits.) 9 items. *1892*  
Material furnished to Franklin L. Pope to assist in the preparation of an article which appeared with the title, "The Genesis of the Modern Dynamo: Antonio Pacinotti," in the *Electrical Engineer*, New York, in the issues dated Sept. 21, Sept. 28, Oct. 5 and Oct. 12, 1892. Included are photographs of Prof. Luigi Pacinotti (father) and of Prof. Antonio Pacinotti; the latter, taken in 1863 or 1864, and the former, in 1882.  
—See also 1601.

2444† bis. **Colladon, (Jean) Daniel. (1802-1893.)** Recherches et expériences sur l'électricité. Huit notices, publiées de 1825 à 1837. 2+11+3+2+9+4+3+3 pp. 4to. *Geneva, 1893*  
1. (Prevost and Colladon.) Note on the Arago disk. 1826.—2. Effect produced on magnetic needle by current from static machine and from clouds, with comment from *Le Globe*. 1826.—3. (Ampère and Colladon.) Note on Arago disk. 1826.—4. Experiment on electro-magnetic induction made in 1825.—5. Experiment on atmospheric electricity. 1826-1828.—6. Experiments on the electric eel. 1831. (Abstract by Arago, with an appendix relating to experiments on the same subject by Du Bois-Reymond, 1884.)—7. Frictional electricity developed in weaving. 1826.—8. Terrestrial currents in railroad tracks and on the shore of the sea, rivers, etc. 1837.

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The experiment on electromagnetic induction (No. 4) anticipated that of Faraday, but the result was negative for the reason that the galvanometer was not of a type to respond to instantaneous current effects and Colladon states he did not suspect that the induction had only an instantaneous effect.  
—See also 547, 915, 1825.

2445. **Cooke, Conrad William.** Automata old and new. 117 pp. ill. pl. 12mo. *London, 1893*

One of the *sette of odd volumes*; description of famous automata, followed by bibliography. Only 255 copies printed. (Chiswick Press.)

2445<sup>†</sup> **bis. Paracelsus.** (1493-1541.) The hermetic and alchemical writings of Aureolus Philippus Theophrastus Bombast, of Hohenheim, called Paracelsus the Great. Now for the first time translated into English. Edited by Arthur Edward Wright. 2 vols. xvi+394+396 pp. 4to. *London, 1894*

The few references made to the properties of the magnet are gross absurdities. Several prescriptions given for wounds and ulcers include powdered lodestone. Gilbert in *De Magnete* expresses contempt for Paracelsus.

2446<sup>†</sup>. **Benjamin, Park.** The intellectual rise in electricity. A History. 611 pp., frontispiece portrait of Gilbert, ill. 8vo. *New York, 1895*

Work of research beginning with the earliest recognized phenomena of electricity and magnetism and ending with the electrical experiments and practical work of Benjamin Franklin. Dr. Park Benjamin's collection now in the Library of the U. S. Naval Academy, Annapolis, Md., contains many of the choice and some of the rare works on electricity and magnetism. His quotations are for the most part from the earliest editions.

2447. **Bright, Edward Brailsford & Charles Bright.** Life story of the late Sir Charles Tilston Bright (1832-1888), civil engineer; with which is incorporated the story of the Atlantic cable, and the first telegraph to India and the colonies, by his brother E. B. Bright and his son C. Bright. 2 vols. portr. ill. pl. facsim., tabl., diagr. 8vo. *Westminster, (1899)*  
Interesting matter relating to the construction, laying and working of the early Atlantic cables with maps and numerous illustrations.  
—See also 1316, 4461.

2447<sup>†</sup> **bis. Wilde, Henry.** Correspondence in the matter of the Society of Arts and Henry Wilde, D. Sc., F.R.S., on the award to him of the Albert Medal, 1900, and on the invention of the dynamo-electric machine. 23 pp. 4to. *Manchester, 1900*

A curious controversy. Wilde not only refused to accept an Albert Medal, awarded to him by the Society of Arts, on the ground that the terms of the award did not specifically state that he was the inventor of the dynamo-electric machine, but actually instituted legal proceedings against the Society to restrain the publication of the award!

—See also 3524.

2447<sup>†</sup> **bis. Hellmann, G.** Ueber die Kenntnis der magnetischen Deklination vor Christoph Columbus. (Extract, Meteorologische Zeitschrift, vol. 4, 1906.) 5 pp., 1 plate. 8vo. *Berlin, 1906*  
Describes and illustrates a pocket sun-dial fitted with a compass, on the face of which is indicated the variation of the magnetic meridian. The dial which

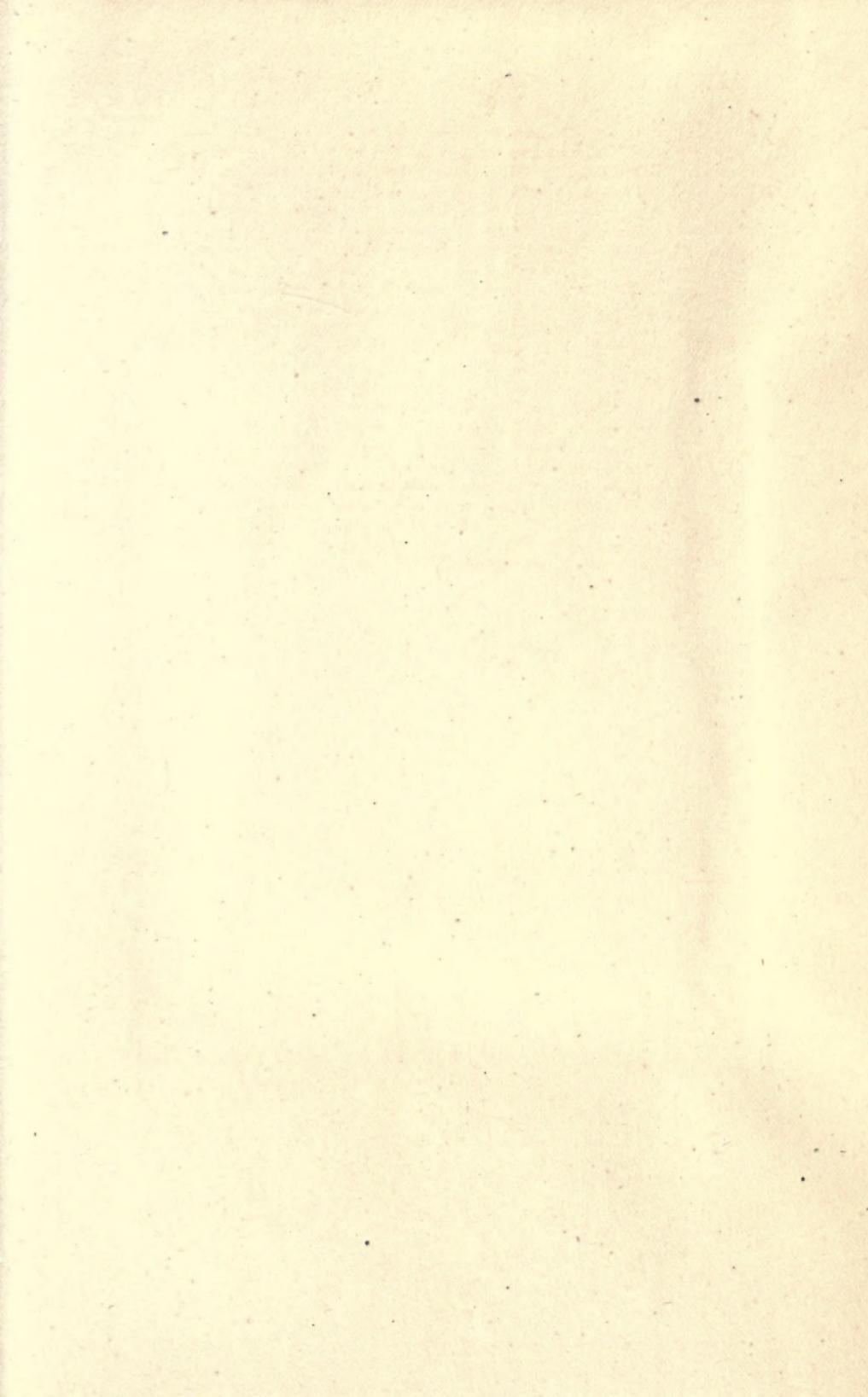
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is now in the Museum Ferdinandeum in Innsbruck, is supposed to have been made in Nuremberg and bears the date of 1451. This dial leads Dr. Hellmann to believe that magnetic variation was known and measured long before Columbus made his first voyage to America.

Dr. Hellmann, of Berlin, is editor of a series of reprints published by A. Asher, Berlin, of rare early publications on meteorology and terrestrial magnetism. Among these are the following:—No. 4. *Die aeltesten Karten der Isogonen, Isoklinen, Isodynamen*: E. Halley, W. Whiston, J. C. Wilcke, A. v. Humboldt, C. Hansteen. 1701-1826.—No. 9. *A discourse mathematical on the variation of the magnetical needle*: Henry Gellibrand, London, 1635.—No. 10. *Rara Magnetica*: P. De Maricourt, F. Falero, P. Nunes, J. De Castro, G. Hartman, M. Cortés, G. Mercator, R. Norman, W. Borough, S. Stevin. 1269-1599.—No 11. *Ueber Luftelektricität*: J. H. Winkler, B. Franklin, T. F. Dalibard, L. G. Le Monnier. 1746-1753.

The Library has received too late for entry, two reprints from *Terrestrial Magnetism* (Washington), by Dr. Hellmann, as follows: 1. The Beginnings of Magnetic Measurements (June, 1899). This is a translation from *Zeitschrift der Gesellschaft für Erdkunde*, Bd. 32, Heft 2, with some additions by the author, but not including an appendix to the German article. Its subject relates to the measurement of the magnetism of the earth. 2. Zur Bibliographie von W. Gilbert's *De Magnete*. (June, 1902.) Includes a list of recorded sales prices of the several editions of *De Magnete*. The London folio (1600) was published at 7 shillings, sixpence.

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